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selecting Snowmobiles FOR FOREST SERVICE WORK



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SELECTING SNOWMOBILES FOR FOREST SERVICE WORK

November 1972

USDA-Forest Service
Equipment Development Center
Missoula, Montana

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ABSTRACT

Selected snowmobiles were evaluated for usefulness in Forest Service winter work. Some 400 different models listed in Snow Goer magazine were separated into four classes on the basis of specifications for track width, engine size and horsepower, and weight. Four snowmobiles — one from each class — were tested at three sites. Conclusions were based on tests made in powder snow, firm snow, and packed snow.

For most Forest Service uses, such as timber management, engineering work, and managing winter recreation, it appears that vehicles with a track width of 16-23 inches will provide the most satisfactory performance. Machines with tracks narrower than 16 inches were useful only on packed snow. Double-tracked machines are heavy and difficult to turn in forested areas. For maximum performance and safety, snowmobiles should carry only the driver. Loads should be towed on a sled. Driver skill, proper maintenance, and the availability of dealer service all influence the usefulness of these machines.

Purchasing guidelines are included.

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INTRODUCTION

By March 1971, there were an estimated 1,798,000 snowmobiles in the United States and Canada.¹ That year, more than 400 different models were available from over 70 manufacturers. With the flood of new makes, models, and accessories, Forest Service personnel faced increasing difficulty selecting suitable snowmobiles for forestry work. The Missoula Center was assigned to evaluate the vehicles available, to determine which ones were most promising for Forest Service uses, and to provide general guidelines for purchasers.

In the planning phase of this project, a questionnaire was sent to Regions where snowmobiles were in use. From the responses, an evaluation was planned that would yield information helpful to field personnel.

Specifications of 1971 snowmobile models

compiled by Snow Goer magazine (appendix A) were analyzed and four classes of snowmobiles were defined. One machine in each class was selected for field evaluation. A method for classifying snow conditions was established, and tests were performed in powder, firm, and packed snow.

The field evaluation was planned to compare performance of typical machines selected from the four classes of snowmobiles. The tests were designed to indicate performance for each class. Individual makes and models were not compared because they can change drastically from year to year and can move from one class to another. Rating snowmobiles for durability, construction, style, etc., was beyond the scope of the project.

Purchasing guidelines are provided in appendix B.

1 Snow Goer, Sept. 1971, p. 11.

SNOWMOBILES

CLASSIFICATION

Specifications for more than 400 different snowmobiles were analyzed. The majority could be separated into four classes on the basis of track width, engine size and power, and machine weight. Table 1 gives the classification characteristics for each of the four classes of snowmobiles. Typical examples of the different machines are shown in figures 1 and 2.

A minimum engine displacement and rated power are specified in an attempt to insure adequate performance (table 1). Minimum engine displacement in cc's is the same for classes 2, 3, and 4. The rated engine horsepower is not the same, however; and larger machines can have higher performance versions of the same basic engine. Snowmobiles with rotary engines were not included in this evaluation.

Table 1. —*Classes of snowmobiles*

Snowmobile class	Track width	Minimum engine		Maximum machine weight ¹
		Cubic centimeters	Horsepower	
1	Single track less than 16 inches wide	292	20	380
2	Single track 16-19 inches wide	395	24	430
3	Single track 20-23 inches wide	395	27	510
4	Single or double track 24 inches and wider	395	27	630

¹ Dry weight including electric starter (30 pounds).



Figure 1. —A 2-ski, 1-track machine typical of classes 1, 2, and 3.



Figure 2. —A 1-ski, 2-track model typical of class 4.

MECHANICAL FEATURES

Clutches. —Either of two types of clutches are used on snowmobiles — a clutch that engages at relatively low engine rpm, or a high-rev clutch, which engages as the engine rpm reaches a high speed cut-in point. When a low-rpm clutch is engaged, the belts slip before the vehicle moves, causing rapid belt wear. The high-rev clutch, delivering higher engine torque as it is engaged, spins the track before the vehicle gets underway, and drivebelt life is extended. Many users favor the high-rev clutch because drivebelts last longer.

The high-rev clutch has one serious shortcoming. To maintain clutch engagement, the engine must be run at higher rpm. In some situations — descending steep slopes, for example — the driver may find he is traveling too fast for safety. If the snowmobile is equipped with a properly adjusted brake, the driver can use it to slow down. He can also slow down, and minimize the need for

braking, by switchbacking across the contour of the slope. To do this, he must have enough room to maneuver, and he must quickly shift his weight on the turns. It is nearly impossible to turn the vehicle quickly if there are two men on a machine.

Suspension systems. —Most manufacturers offer both slide-rail and bogie-wheel suspensions (figs. 3 and 4). The slide-rail system requires less power to move, offers more stability on all types of snow, produces more tractive effort because bearing pressure is evenly distributed throughout the track, increases top speed approximately 10 mph, provides easy access to track adjustments, and in many cases weighs less than bogie systems.

Some snowmobile users say they get a smoother ride with the slide rail suspension than with the bogie suspension. Snow acts as a lubricant, but mud or dry soil imbedded in the rail can wear away the metal cleats that mesh with the track drive sprockets.

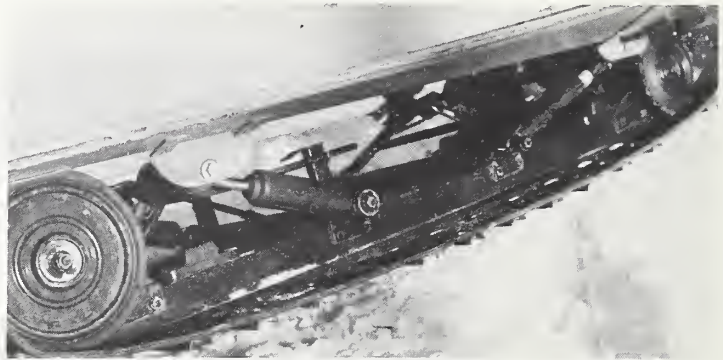


Figure 3. —Slide-rail suspension.

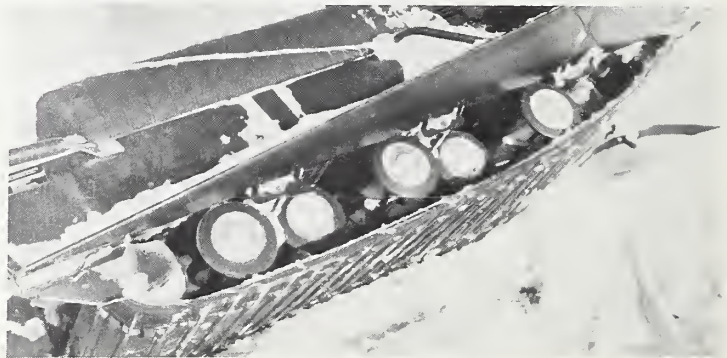


Figure 4. —Bogie-wheel suspension.

SNOW CONDITIONS

To evaluate the performance of the snowmobile in a variety of snow conditions, three different sites were selected. It was intended that the three sites would provide four snow conditions: powder, soft, firm, and packed.

CLASSIFICATION

The four types of snow were classified by:

A 4-inch diameter steel weight at ambient temperature having a bearing load of 1 pound per square inch was gently placed on the snow. The weight was removed and the penetration depth measured (fig. 5). Table 2 shows criteria defining the four snow conditions.

This method of measuring was used only on undisturbed snow without a crust. No attempt was made to correlate the results with vehicle penetration.



Figure 5. —Measuring snow condition.

Table 2. —*Classification of snow conditions*

Classification	Penetration Inches
Powder snow	10 or more
Soft snow	4 to 10
Firm snow	1 to 4
Packed snow	0 to 1

SNOW CONDITIONS DURING TESTS

POWDER SNOW

One powder snow test site was at an elevation of about 8,200 feet. Snow depth was approximately 4½ feet. The test weight penetrated 18 inches. Weather was snowy during the tests, with temperatures from 0° to 20°F.

Another test site was at less than 2,000-feet elevation in gentle rolling hills with shallow inclines, most of which were densely covered with trees and brush. In this area generally noted for firm snow, the test weight indicated powder, with 12½ to 15½ inches of penetration recorded. Temperatures had been below freezing for 7 weeks — unusually cold for the area — and snow depths were approximately 30 inches, which was much deeper than average.

FIRM SNOW AND PACKED SNOW

The third test site was an abandoned ski slope at approximately 7,300-foot elevation. Mild temperatures had produced a base of firm snow with a cover of about 4 inches of new snow. Temperatures ranged from 30°F during the day to below 0°F at night. In this area, packed snow conditions were obtained only during the marked trail tests.

SOFT SNOW

Soft snow was not found at any of the three test sites in amounts sufficient for testing. Since powder snow provides the most difficult operating conditions and two good powder test sites were found, it was decided to abandon any soft snow tests.

DESCRIPTION OF TESTS

Tests were planned to evaluate the four classes of snowmobiles under conditions simulating Forest Service use. Originally, machines carrying 1 man, 2 men, and 1 man while pulling a 200-pound sled load were to be tested on four different snow surfaces for slope climb, turning radius, maximum speed, slideslope, and marked trail. As has been mentioned, only three of the four snow conditions were found at the test sites. In spite of the general availability of three types of snow, parts of some tests could not be run because of inadequate snowmobile performance under particular conditions. Other tests, such as maximum speed and minimum turning diameter, required that only the operator be on the machine.

The slope test was designed to measure how steep a slope a snowmobile can climb (fig. 6). Four snowmobiles, one from each class, were driven directly up the slope. If the machine stopped because of a loss of traction, a slipping drivebelt, or other reasons, the slope was measured at the stopping point.

For the minimum turning diameter test, two different operators drove each snowmobile in as small a circle as possible in both clockwise and counter-clockwise directions. Diameters were recorded for each operator and the corresponding turns were averaged (fig. 7).

The maximum speed of each of the four snowmobiles on flat terrain was also determined. Each machine was timed over a measured distance. The maximum sidehill slope that could be contoured by the four machines was recorded in a contouring test.

The last test was to drive the snowmobiles over a marked trail to test combined slope climbing, contouring, turning, and speed. This was accomplished on a packed snow trail and average speed was recorded. Speed alone is not important for Forest Service use, but can be an important indicator of overall performance.



Figure 6. —Slope climb test in firm snow, two men on the machine.



Figure 7. —Measuring turning diameter on firm snow.

TEST RESULTS

SLOPE CLIMB

In deep powder snow, the slope climb was attempted with only one man operating each snowmobile. In firm snow, tests were made with one man, two men, and one man towing a 200-pound load (fig. 8, table 3).

There was a marked reduction in performance in powder snow by all classes of snowmobiles. In firm snow, the advantages of the power and traction of the class 3 and 4 machines became evident. Adding the weight of another man or a towed sled decreased slope-climbing performance on firm snow and cancelled it out in powder snow. The class 3 machine generally outperformed the other snowmobiles in hill-climbing.



Figure 8. —Snowmobile towing sled.

Table 3. —Maximum slope climb

Snowmobile class	Powder snow	Firm snow		
	1 man on snowmobile	1 man on snowmobile	2 men on snowmobile	1 man, 200-pound load on sled
	Percent	Percent	Percent	Percent
1	6	27	20	12
2	12	27	22	12
3	12	44	35	27
4	10	41	25	20

TURNING DIAMETER

Results of turning diameter tests in powder and firm snow are shown in table 4. In powder snow, average turning diameters ranged from 25 to 31 feet; on firm snow, 18 to 41 feet.

An experienced operator shifts his body weight when turning. By holding onto the right handlebar where the throttle is located, he tends to lift the machine more forcefully into a counter-clockwise turn, thus reducing turning diameter. Although this is not always true, it does occur in most instances. Table 4 illustrates that class 4

snowmobiles are difficult to turn on firm snow as shown by the greater turning diameters.

SPEED TRIALS

Speed trials were completed on powder snow and firm snow, with one man operating a snowmobile for each class. Table 5 shows that in powder snow, class 2 and 3 snowmobiles outperform classes 1 and 4. In firm snow, which provides more traction, there was no significant difference among class 1, 2, and 4 machines and all were outperformed by the class 3 machine.

Table 4. — *Turning diameters*

Snowmobile class	Powder snow			Firm snow		
	Clockwise	Counter-clockwise	Average	Clockwise	Counter-clockwise	Average
	Feet	Feet	Feet	Feet	Feet	Feet
1	29.4	33.4	31.4	19.4	16.2	17.8
2	26.1	24.2	25.1	26.2	20.5	23.3
3	29.4	26.9	28.1	27.2	29.5	28.3
4	32.7	27.0	29.8	42.1	40.1	41.1

Table 5. — *Maximum speed, one man on each snowmobile*

Snowmobile class	Powder snow	Firm snow
	Mph	Mph
1	12.8	38.2
2	15.3	37.3
3	18.4	44.4
4	11.6	39.7

CONTOURING SLOPES

Figure 9 shows the position an experienced operator assumes to contour on steep slopes. By extending his weight as far as possible to the uphill side, he causes the uphill edge of the track to dig



Figure 9. —Contouring slope, one man on snowmobile.

into the slope. This increases traction and helps to stabilize the machine on steep slopes.

Results of contouring tests shown in table 6 indicate that in powder snow, classes 2 and 3 showed the best performance. Class 1 is the easiest snowmobile for the operator to maneuver because of its lightweight. However, in powder snow, the small track lacks the flotation necessary to hold the machine on a steep slope. The class 4 machine usually has sufficient track area for operation in powder snow, but it is much too heavy to maneuver and hold on a slope and slips downslope more often as the hillside gets steeper.

In powder snow with two men on the machines, or when towing a loaded sled, the operator was not able to drive any of the snowmobiles along a contour.

On firm snow, performance was similar for all classes. The operators were able to drive all snowmobiles along the contour on steep slopes. Neither the added weight of an extra man nor a 200-pound load towed on a sled, limited performance of any snowmobile being tested.

Table 6. —Maximum slope contoured

Snowmobile class	Powder snow	Firm snow		
	1 man on snowmobile	1 man on snowmobile	2 men on snowmobile	1 man, 200-pound load on sled
	Percent	Percent	Percent	Percent
1	25	30	27	27
2	30	30	27	27
3	30	30	27	27
4	19	30	27	27

MARKED TRAIL

Table 7 shows results of a test on a packed snow trail. Class 3 gave the best performance because it had sufficient horsepower for its weight to rapidly gain speed coming out of turns, and for building momentum to climb slopes. This class of snowmobile is still light enough to be maneuverable in timbered areas. The data indicate that the class 1 machine on packed snow is second in speed with only one man riding. Adding the second man reduces snowmobile performance in all classes, but this is most pronounced in class 1. Performance of the class 2 and 4 machines was about equal. The class 4 machine has sufficient horsepower, but weight and size restricts maneuverability. The class 2 machine has less horsepower but makes up for this with less weight and increased maneuverability.

Table 7. — *Test on designated trail*

Snowmobile class	Packed snow	
	1 man	2 men
	Mph	Mph
1	23.6	10.4
2	19.4	16.6
3	26.1	21.0
4	19.5	15.1

DISCUSSION OF RESULTS

In powder snow, none of the snowmobiles operated effectively on slopes over 12 percent and often bogged down on flat terrain. All classes contoured at least a 19 percent sideslope, but none of the snowmobiles could climb a grade and maintain momentum while contouring. When the machine lost momentum, it would slide downslope. Class 2 and 3 snowmobiles gave the

best performance. Increased weight seemed to provide additional traction and stability. The class 4 snowmobile was also heavier but too hard to maneuver when contouring in powder snow. It could not be freed easily when stuck.

In firm snow, all machines operated better than in powder snow, except in turning, where results varied. Carrying one person, classes 1, 2, and 3 handled well and were easily controlled. The class 4 snowmobile was heavy, did not respond as well to turning, and the driver could not control the attitude.

Packed snow testing, which was restricted to a test on a designated trail, indicated class 3 machines were the fastest. The class 1 snowmobile was second fastest carrying only the operator, but was slowest by a significant margin when carrying two men. All four classes performed well on packed snow.

GENERAL OBSERVATIONS

Snowmobiles are usually advertised as machines for winter sport. Although not designed for work, they are being used for many Forest Service tasks during winter months. However, Forest Service personnel required to operate snowmobiles should be trained to recognize limitations of these machines and should be given maintenance guidelines. Proper driving and maintenance is the key to useful and safe snowmobile operation.

During the field evaluations, equipment managers and snowmobile users in the three test areas were questioned about common problems encountered in snowmobile operations. Suggestions gleaned from these men are presented in appendix C. An additional consensus was strongly in favor of only one man on each machine.

Cargo sleds are commonly used with snowmobiles. Many models of sleds or toboggans are available, and users should select the ones most suitable for their work. Sleds should have a rigid hitchpoint. One man on a machine towing a sled loaded with gear is a good way to distribute the load.

For hauling snowmobiles, a trailer is better than a pickup truck. Trailers are easier to load and unload than a pickup and machines can be readily tied down. A snowmobile trailer should have the following features: (1) Two (inner and outer) bearings in each wheel hub; (2) low profile, swing away tongue and tilting platform; (3) decking made of expanded metal or other material that will permit snow to filter through the floor and not build up and become slippery; (4) safety chains; (5) tail light and license rack; (6) marking and running lights properly affixed and protected; (7) spare tire and wheel; and (8) a ball-socket coupler on the tongue.

SURVEY OF USERS

A questionnaire was sent to six Regions that use snowmobiles. Replies were summarized, and the summary was used to plan various performance tests of snowmobiles. The summary indicated the following facts:

1. Snowmobiles are used for timber management more than for any other purpose. Engineering jobs were next in importance, followed by winter recreation management.
2. A majority of snowmobiles are operated with one man on the machine, and supplies are towed on a sled.
3. The model of snowmobile used is directly related to availability of service and dealers.
4. Field personnel wanted the following information—
 - (a) Performance, such as climbing and maneuverability, in various snow conditions and terrain;

- (b) Maintenance information;
- (c) Availability of service, parts, and accessories;
- (d) Storage, for carrying gasoline, skis, snowshoes, survival gear.

CONCLUSIONS

Snowmobiles in classes 2 and 3 (table 1) appear to be best for Forest Service work. Tracks are wide enough to be stable and the machines are light enough for one man to lift when stuck. In emergencies, two people can ride one machine, especially on packed snow. In powder snow conditions, class 2 and 3 snowmobiles contour sideslopes best. Performance for all machines was similar when contouring sideslopes on firm snow.

Class 1 snowmobiles are of limited use. Although satisfactory for transporting one man on packed and firm snow, performance is significantly less than the class 2 and 3 machines in powder snow.

Class 4 snowmobiles also have limited usefulness for Forest Service work. These snowmobiles are too heavy for one man to handle in deep powder snow. Although class 4 snowmobile performance was about the same as the class 2 machine, and better in some cases, its performance was significantly less in the areas of maneuverability and powder snow operation. The class 4 performance was generally the same or better than that of the class 1 machine, but in almost every instance the class 3 machine was superior to the class 4 machine.

For the best performance and operation, snowmobiles should carry only the driver.

RECOMMENDATIONS

The purchasing guidelines in appendix B should be considered when buying snowmobiles for Forest Service use. These are sample guidelines based on test results and on interviews with equipment managers experienced in purchasing snowmobiles. The guidelines should be modified to meet local conditions and use.

APPENDIX A

SUMMARY SPECIFICATIONS
ON SNOWMOBILES - 1971

CLASS*	MODEL	ENGINE MAKE & CC'S	HORSE-POWER	NUMBER OF CYLINDERS	TRACK (INCHES) ON GROUND & SUSPENSION	OVERALL HEIGHT, WIDTH & LENGTH (INCHES)	STARTING SYSTEM	FUEL CAPACITY (GALLONS)	APPROX. WEIGHT (POUNDS)	MFG'S SUGGESTED RETAIL PRICE	Options
ALSPORT INC., 84 WHITTLESEY, NORWALK, OHIO 44857											
--	Alisport Tracker 2/10	375	22	Single	2/10-1/2x41 Bogie	42x60x122	Electric	6	625	\$1,795	Options include rally pack (woodgrain dash speedometer, tachometer, hour meter); gullwing convertible top, storage rack, cover, wheels or skis.
--	Alisport Tracker 2/10	395	24	Single	2/10-1/2x41 Bogie	42x60x122	Electric	6	625	\$1,795	
--	Alisport Tracker 2/10	399	30	Single	2/10-1/2x41 Bogie	42x60x122	Electric	6	625	\$1,795	
--	Alisport Tracker GT-13	399	30	Single	2/10-1/2x41 Bogie	42x60x122	Electric	6	750	NA	
--	Alisport Tracker GT-13	634	38	Twin	2/10-1/2x41 Bogie	42x60x122	Electric	6	750	NA	
AMERICAN MACHINE & FOUNDRY, WHITEPOUR RO., YORK, PA. 17402											
1	AUP Mark IV-300	JLO 295	20	Single	15x43 Bogie	41.2x33.5x96	Recoll	5	330	\$995	Electric start optional on Mark IV-300.
2	AUP Mark V-400E	Hirth 399	28	Twin	15x43 Bogie	41.2x33.5x96	Recoll	5	380	\$1,195	Mark V-400, and Mark V-640. Tachometer, cigarete lighter also optional with electric start kit installed.
2	AUP Mark V-400E	Hirth 399	28	Twin	15x43 Bogie	41.2x33.5x96	Electric/Recoll	5	415	\$1,295	
2	AUP Mark V-600E	Kohler 399	28	Twin	15x43 Bogie	41.2x33.5x96.7	Electric/Recoll	5	425	\$1,345	
2	AUP Mark V-600E	Hirth 493	30	Twin	15x43 Bogie	41.2x33.5x96.7	Electric/Recoll	5	425	\$1,430	
2	AUP Mark V-640	Hirth 634	40	Twin	15x43 Bogie	41.2x33.5x96.7	Recoll	5	395	\$1,495	
ARCTIC ENTERPRISES, INC., THREE RIVER FALLS, MINN. 56701											
--	Panther P303	303	NA	Rotary	17x41 Slide rail	29x30x74	Recoll	4.5	405	\$1,135	Engines available include Kawasaki, Hirth, JLO, Sachs, Wankel and Kohler. Electric start available on all except P303. Also optional: tuned mufflers, seat ext. with tool box, tach., speedometer, shock absorber kit, windshield ext. kit, auxiliary tank.
--	Panther P340	340	NA	Single	17x30 Slide rail	29x30x74	Recoll	4.5	310	\$995	Options include tuned mufflers, seat extension with toolbox underneath, tachometer, speedometer, ski shock absorber kit, windshield extension kit, auxiliary gas tank and track studding kit.
--	Panther P340	398	NA	Twin	17x30 Slide rail	29x30x74	Recoll	4.5	340	\$1,100	
2	Puma FM 399	436	NA	Twin	17x30 Slide rail	29x30x74	Recoll	4.5	340	\$1,175	
--	Puma FM 650	634	NA	Twin	17x30 Slide rail	29x30x74	Recoll	4.5	375	\$1,495	
--	Lynx L295	292	NA	Single	17x30 Slide rail	29x30x74	Recoll	4.5	310	\$995	Options include tuned mufflers, tach., speedometer, shock absorber kit, windshield ext. kit, auxiliary tank.
--	Lynx L303	303	NA	Single	17x30 Slide rail	29x30x74	Recoll	4.5	310	\$995	Options include tuned mufflers, tachometer, ski shock absorber kit, windshield extension kit, auxiliary gas tank and track studding kit.
--	Lynx L340	340	NA	Single	17x30 Slide rail	29x30x74	Recoll	4.5	310	\$995	
--	Ext E295	292	NA	Twin	17x30 Slide rail	29x30x74	Recoll	4.5	335	\$1,150	
--	Ext E340	339	NA	Twin	17x30 Slide rail	29x30x74	Recoll	4.5	335	\$1,150	
2	Ext E399	398	NA	Twin	17x30 Slide rail	29x30x74	Recoll	4.5	340	\$1,195	
2	Ext E440	436	NA	Twin	17x30 Slide rail	29x30x74	Recoll	4.5	340	\$1,250	
ARJENS CO., 655 W. RYAN, BRILLION, WIS. 54110											
--	Arrow 275S	Sachs 277	14	Single	15x45 Bogie	30x32x100	Recoll	5	300	\$725	Options include electric key start on all except 275S and 440SX.
1	Arrow 300S	Sachs 293	20	Single	15x45 Bogie	30x35-1/2x100	Recoll	5	325	\$845	
1	Arrow 350S	Kohler 338	24	Twin	15x45 Bogie	30x35-1/2x100	Recoll	5	345	\$995	
2	Arrow 400L	Kohler 399	28	Twin	15x45 Bogie	30x35-1/2x100	Recoll	5	365	\$1,145	
1	Arrow 400SX	Kohler 399	28	Twin	15x45 Bogie	30x35-1/2x100	Recoll	5	345	\$1,085	
1	Arrow 440SX	Sachs 437	35	Twin	15x45 Slide rail	30x35-1/2x100	Recoll	5	350	\$1,240	
AUTO SKI INC., C.P. 242, LEWIS, QUEBEC											
--	Mini Jet	Sachs 225	12.5	Single	15-1/2x30 Bogie	42x33x102	Recoll	3 Imp.	190	\$595	Options include speedometer, tachometer, oiler lighter, reverse, electric start, console panel and 18-1/2-inch track on Camaro, Torino and Spitfire models.
--	Midget	Sachs 280	14	Single	15-1/2x30 Bogie	42x33x102	Recoll	3 Imp.	295	\$725	
--	Bonanza	Sachs 290	20	Single	15-1/2x40 Bogie	42x33x102	Recoll	5 Imp.	310	\$825	
--	Bonanza-E	Sachs 290	20	Twin	15-1/2x40 Bogie	42x33x102	Electric	5 Imp.	310	\$950	
1	Torino	Sachs 340	24	Twin	15-1/2x40 Bogie	42x33x102	Recoll	5 Imp.	325	\$925	
1	Spitfire	CCW 400	30	Twin	15-1/2x40 Bogie	42x33x102	Recoll	5 Imp.	325	\$995	
1	Spitfire-E	Sachs 440	35	Twin	15-1/2x40 Bogie	42x33x102	Recoll	5 Imp.	330	\$1,175	
--	Avenger I	Sachs 340	24	Twin	15-1/2x40 Bogie	42x33x102	Recoll	5 Imp.	365	\$1,025	
--	Avenger II	Sachs 440	35	Twin	15-1/2x40 Bogie	42x33x102	Recoll	5 Imp.	365	\$1,275	
2	Avenger II-E	Sachs 440	35	Twin	15-1/2x40 Bogie	42x33x102	Electric	5 Imp.	365	\$1,400	
2	Avenger III	Sachs 624	40	Twin	15-1/2x40 Bogie	42x33x102	Recoll	5 Imp.	365	\$1,445	
BOA SKI INC., LA GUADELLOPE, COMTE FRONTENAC CTY., QUEBEC, CANADA											
1	Mark I	Hirth 292	19	Single	15-1/2 (width) Bogie	32x33x96	Recoll	4	280	NA	Options include electric start and 3 quart nylon reserve gas tank on all models.
1	Mark I	JLO 295	19	Single	15-1/2 (width) Bogie	32x33x96	Recoll	4	280	NA	
1	Mark II	Hirth 292	19	Single	15-1/2 (width) Bogie	32x33x96	Recoll	4	285	NA	Speedometer standard on Mark II and III; tach. optional on all models. All models feature 3/8-inch double drive chain, dual headlights and key switch ignition.
1	Mark II	Hirth 338	20	Single	15-1/2 (width) Bogie	32x33x96	Recoll	4	330	NA	
1	Mark II	JLO 340	22	Twin	15-1/2 (width) Bogie	32x33x96	Recoll	4	335	NA	
1	Mark II	Hirth 438	24	Twin	15-1/2 (width) Bogie	32x33x96	Recoll	4	340	NA	
1	Mark II	Hirth 493	28	Twin	15-1/2 (width) Bogie	32x33x96	Recoll	4	340	NA	
--	Mark II	Hirth 634	36	Twin	15-1/2 (width) Bogie	32x33x96	Recoll	4	360	NA	
--	Cobra	Hirth 438	24	Twin	18 (width) Bogie	32x33x102	Recoll	4	NA	NA	
--	Cobra	Hirth 493	28	Twin	18 (width) Bogie	32x33x102	Recoll	4	NA	NA	
--	Cobra	Hirth 636	36	Twin	18 (width) Bogie	32x33x102	Recoll	4	NA	NA	
3	Grand Prix	CCW 399	30	Twin	20x40 Bogie torsion	43x37x104	Electric/Recoll	5	420	\$1,795	Speedometer, tach., gas gauge standard.

* Denotes information added by the Macaula Equipment Development Center.

--Denotes that this machine could not be classified because one or more features--track width, horsepower or cubic centimeters, weight--fall outside established limits.

BOLENS DIV., FMC CORP. FORT WASHINGTON, WIS. 53074											
		Boles 292	17 @ 6000	Twin	15 (width) Bogie	30x31-1/2x31	Recall	4.25	270	\$795	With windshield. Options include electric start, tachometer, speedometer, covers, snow flaps, gas gauge, tow-behind sled, snowmobile suits, seat riser, and performance kits. Machine accessories available on all but 80292 and 81000 series.
1	Husky Sprint 80292	Boles 292	17 @ 6000	Twin	15 (width) Bogie	30x31-1/2x31	Recall	4.25	270	\$795	
--	Husky Sprint 80295	Boles 292	22 @ 6000	Twin	15-1/2 (width) Bogie	34x32x103	Recall	6	355	\$995	
--	Husky Sprint 80340	Boles 336	24 @ 6000	Twin	15-1/2 (width) Bogie	34x32x103	Recall	6	355	\$1,145	
2	Husky Sprint 80399	Boles 336	28 @ 6000	Three	18 (width) Bogie	42x34x104	Recall	6.6	385	\$1,245	
2	Husky Sprint 80440	Boles 438	32 @ 6000	Three	18 (width) Bogie	42x34x104	Recall	6.6	385	\$1,345	
1	Husky Sprint 81295	Boles 292	NA	Twin	15-1/2 (width) Slider	34x32x103	Recall	4	315	NA	
1	Husky Sprint 81340	Boles 336	NA	Twin	15-1/2 (width) Slider	34x32x103	Recall	4	315	NA	
1	Husky Sprint 81399	Boles 336	NA	Three	15-1/2 (width) Slider	34x32x103	Recall	4	325	NA	
1	Husky Sprint 81440	Boles 438	NA	Three	15-1/2 (width) Slider	34x32x103	Recall	4	325	NA	
BOMBARDIER LTD., VALCOURT, QUEBEC, CANADA											
--	Ski-Doo Elan 250	Rotax 247	12	Single	15 (width) Bogie	33-1/2x29-1/2x28-1/2	Recall	3.8 Imp.	246	\$695	Double action slide suspension is available on T/N models. Speedometer and tachometer optional on all models except 640's and T/N's, which have them as standard equipment. Cigarette lighter also standard on all 640's. Saddle bags optional on all models except T/N series, Olympique 300 and Elan series.
--	Ski-Doo Elan 250E	Rotax 247	12	Single	15 (width) Bogie	33-1/2x29-1/2x28-1/2	Electric	3.8 Imp.	246	\$695	
1	Ski-Doo Olympique 300	Rotax 339	15	Single	15 (width) Bogie	34-3/4x30-5/8x29-3/4	Recall	5 Imp.	330	\$825	
1	Ski-Doo Olympique 335E	Rotax 335	18	Single	15 (width) Bogie	34-3/4x30-5/8x29-3/4	Recall	5 Imp.	330	\$825	
1	Ski-Doo Olympique 335E	Rotax 335	18	Single	15 (width) Bogie	34-3/4x30-5/8x29-3/4	Electric	5 Imp.	360	\$945	
1	Ski-Doo Olympique 399	Rotax 399	24	Twin	15 (width) Bogie	34-3/4x30-5/8x29-3/4	Recall	5 Imp.	347	\$945	
2	Ski-Doo Nordic 399	Rotax 399	24	Twin	18 (width) Bogie	33x34x100-3/4	Recall	5 Imp.	360	\$1,045	
2	Ski-Doo Nordic 399E	Rotax 399	24	Twin	18 (width) Bogie	33x34x100-3/4	Electric	5 Imp.	395	\$1,165	
2	Ski-Doo Nordic 640E	Rotax 635	35	Twin	18 (width) Bogie	33x34x100-3/4	Electric	5 Imp.	430	\$1,345	
4	Ski-Doo Alpine 399ER	Rotax 399	24	Twin	2/15 (width) Bogie	39x35x119	Recall	7 Imp.	508	\$1,375	
4	Ski-Doo Alpine 640ER	Rotax 399	24	Twin	2/15 (width) Bogie	39x35x119	Electric	7 Imp.	543	\$1,495	
4	Ski-Doo Valmont 399ER	Rotax 339	24	Twin	2/15 (width) Bogie	39x35x105-1/2	Recall	7 Imp.	485	\$1,275	
4	Ski-Doo Valmont 399ER	Rotax 339	24	Twin	2/15 (width) Bogie	39x35x105-1/2	Electric	7 Imp.	485	\$1,395	
4	Ski-Doo Valmont 640ER	Rotax 635	35	Twin	2/15 (width) Bogie	39x35x105-1/2	Electric	7 Imp.	520	\$1,645	
1	Ski-Doo T/N 292	Rotax 292	19	Single	15 (width) Bogie	34x30-5/8x29	Recall	5 Imp.	310	\$875	
1	Ski-Doo T/N 340	Rotax 335	22	Single	15 (width) Bogie	34x30-5/8x29	Recall	5 Imp.	315	\$975	
2	Ski-Doo T/N 440	Rotax 437	35	Twin	18 (width) Bogie	36x34x100	Recall	5 Imp.	360	\$1,195	
2	Ski-Doo T/N 640	Rotax 635	40	Twin	18 (width) Bogie	36x34x100	Recall	5 Imp.	390	\$1,345	
2	Ski-Doo T/N 775	Rotax 771	60	Twin	18 (width) Bogie	36x34x100	Recall	5 Imp.	430	\$1,495	
--	Ski-Doo Blizzard Series:	Five models, one for each racing class; specs not available at this time.									
BONANZA INDUSTRIES, INC., 1775 S. FIRST, SAN JOSE, CALIF. 95112											
2	Stormer I #295	JLO 295	21	Single	18 (width) Bogie	94 (length)	Recall	4	275	\$695	Options include electric start on Stormer I and II series; 5 gal. gas tank on Stormer II series and racing cowling, all-weather vinyl cover, tachometer and speedometer on all models.
--	Stormer I #340	JLO 340	25	Single	18 (width) Bogie	94 (length)	Recall	4	275	\$995	
--	Stormer II #307/2	JLO 309	28	Twin	18 (width) Bogie	94 (length)	Recall	4	295	\$1,095	
2	Stormer SR #340	Sachs 340	26	Single	18 (width) Slide rail	93 (length)	Recall	4	270	NA	
2	Stormer SR #440	Sachs 440	40	Twin	18 (width) Slide rail	93 (length)	Recall	4	285	NA	
2	Stormer SR #634	Hirth 634	55	Twin	18 (width) Slide rail	93 (length)	Recall	4	305	NA	
2	Stormer SR #793	Hirth 793	80	Three	18 (width) Slide rail	93 (length)	Recall	4	345	NA	
CHAPARRAL INDUSTRIES INC., 5995 N. WASHINGTON ST., DENVER, COLO. 80216											
1	Skylark	Hirth 292	19	Single	15-1/2 (width) Bogie	33x34x100	Manual	5	312	\$795	Options include 340 COW, 440 COW and 793 Hirth engines on all three series, electric start on Firebirds and Executives; sports suspension package, ski shock absorber, backrest, tachometer, speedometer, amp gauge and cigarette lighter on all models. All are standard with Salisbury torque sensitive transmission, caliper disc brakes, aluminum chassis and 16 independently sprung bogie wheel suspension.
1	Skylark	Hirth 338	24	Single	15-1/2 (width) Bogie	33x34x100	Manual	5	312	\$795	
1	Skylark	Hirth 372	28	Single	15-1/2 (width) Bogie	33x34x100	Manual	5	312	\$795	
1	Firebird	Hirth 338	24	Single	15-1/2 (width) Bogie	33x34x100	Manual	5	300	\$795	
1	Firebird	JLO 340	26	Twin	15-1/2 (width) Bogie	33x34x100	Manual	5	300	\$1,045	
1	Firebird	JLO 399	28	Twin	15-1/2 (width) Bogie	33x34x100	Manual	5	330	\$1,095	
1	Firebird	Hirth 438	38	Twin	15-1/2 (width) Bogie	33x34x100	Manual	5	330	\$1,195	
1	Firebird	Hirth 493	30	Twin	15-1/2 (width) Bogie	33x34x100	Manual	5	330	\$1,225	
1	Firebird	Hirth 634	36	Twin	15-1/2 (width) Bogie	33x34x100	Manual	5	330	\$1,295	
1	Executive	JLO 399	24	Twin	15-1/2 (width) Bogie	33x34x100	Manual	5	345	\$1,145	
--	Executive	Hirth 438	28	Twin	15-1/2 (width) Bogie	33x34x100	Manual	5	345	\$1,195	
--	Executive	Sachs 440	35	Twin	15-1/2 (width) Bogie	33x34x100	Manual	5	345	\$1,295	
--	Executive	Hirth 438	30	Twin	15-1/2 (width) Bogie	33x34x100	Manual	5	345	\$1,295	
--	Executive	Hirth 634	36	Twin	15-1/2 (width) Bogie	33x34x100	Manual	5	345	\$1,325	
--	Thunderbird Racer	See local dealers for specs on this limited production racing model.									
CUSHMAN MOTORS, DIV. OMC, 900 NO. 21ST ST., LINCOLN, NEB. 68501											
--	Trackster	OMC 437	25 @ 5000	Twin	2000 sq. in. Bogie	41x62x92	Electric	10	1,040	\$2,695	Cab, windshield, flotation ring optional.
DAUPHIN LITE, 12500 DES HETRES, GRAND-MERE, QUEBEC, CANADA											
--	D1150	Hirth 246	12	Single	15-1/2 Bogie	29-1/2x31x100	Manual	5.4	298	\$699	Electric start is optional on all models.
1	D1500	Hirth 292	15	Single	15-1/2 Bogie	29-1/2x31x100	Manual	5.4	NA	NA	
1	D1900	Hirth 292	19	Single	15-1/2 Bogie	29-1/2x31x100	Manual	5.4	NA	NA	
1	D1900E	Hirth 292	19	Single	15-1/2 Bogie	29-1/2x31x100	Electric	5.4	NA	NA	
1	D2200	Hirth 399	22	Twin	15-1/2 Bogie	29-1/2x31x100	Manual	5.4	NA	NA	
1	D2400	Hirth 438	24	Twin	15-1/2 Bogie	29-1/2x31x100	Manual	5.4	NA	NA	
--	D2800	Hirth 493	28	Twin	15-1/2 Bogie	29-1/2x31x100	Manual	5.4	NA	NA	
--	D3600	Hirth 634	36	Twin	15-1/2 Bogie	29-1/2x31x100	Manual	5.4	415	\$1,349	

*See additions on page A-9.

CLASS*	MODEL	ENGINE MAKE & CC'S	HORSE-POWER	NUMBER OF CYLINDERS	TRACK (INCHES MAKE & SUSPENSION)	OVERALL HEIGHT, WIDTH & LENGTH (INCHES)	STARTING SYSTEM	FUEL CAPACITY (GALLONS)	APPROX. WEIGHT (POUNDS)	MTG'S SUGGESTED RETAIL PRICE
EAGLE MACHINE COMPANY LTD., LONDON, ONTARIO, CANADA										
--	Sno-Hawk 230	JTD 223	15	NA	15 (width) Bogie	33-1/4x32-3/4x100-3/4	Recall	4.3	320	NA
1	Sno-Hawk 295	JTD 332	20.5	NA	15 (width) Bogie	33-1/4x32-3/4x100-3/4	Recall	4.3	340	NA
1	Sno-Hawk 340	JTD 336	23	NA	15 (width) Bogie	33-1/4x32-3/4x100-3/4	Recall	4.3	341	NA
--	Sno-Hawk 440	JTD 435.8	28	NA	15 (width) Bogie	33-1/4x32-3/4x100-3/4	Recall	4.3	363	NA
ESKIMO SNOWMOBILE INC., 171 HYMAN BLVD., POINTE CLAIRE, QUEBEC, CANADA										
--	Eskimo 280M	Sachs 277	14	Single	15x50 Bogie	35x32x95	Manual	4.5	280	NA
1	Eskimo 290M/E	Sachs 293	20	Single	15x50 Bogie	35x32x98	Manual	4.5	290/330	NA
2	Eskimo 434M/E	Sachs 436	35	Twin	18x50 Bogie	33x32x98	Manual/Elec.	4.5	350/390	NA
1	Eskimo H/T 1	Sachs 336	27	Single	15x50 Bogie	35x32x100	Manual/Elec.	4.5	295	NA
1	Eskimo H/T 5	Sachs 293	25	Single	15x50 Bogie	35x32x100	Manual	4.5	295	NA
1	Eskimo H/T 2	Sachs 436	38	Twin	15x50 Bogie	35x32x96	Manual	4.5	320	NA
2	Eskimo H/T 3	Sachs 740	60	Twin	18x50 Bogie	37x46x94	Manual	4.5	400	NA
EVINDRUE MOTORS, DIV. OF OMC, 4143 N. 27TH ST., MILWAUKEE, WIS. 53216										
3	Skeeter E-2015	OMC 437	30 • 5800	Twin	20-1/2x40-3/4 Bogie	37-1/2x37x103	Electric	6	NA	\$1,435
3	Skeeter E-2010	OMC 437	30 • 5800	Twin	20-1/2x40-3/4 Bogie	37-1/2x37x103	Manual	6	NA	\$1,395
3	Skeeter E-2005	OMC 437	25 • 5000	Twin	15-3/4x40-3/4 Bogie	49-1/2x34-1/2x101	Electric	6.5	NA	\$1,255
1	Bobcat E-2510-M	OMC 437	25 • 5300	Twin	15-3/4x40-3/4 Bogie	34-1/2x32 9/16x96	Manual	6	NA	\$995
1	Bobcat E-2510	OMC 437	25 • 5300	Twin	15-3/4x40-3/4 Bogie	34-1/2x32 9/16x96	Manual	6	NA	\$950
1	Bobcat SS-2521 H-P	OMC 437	32 • 6200	Twin	15-3/4x40-3/4 Bogie	34-1/2x32 9/16x96	Manual	6	NA	\$1,095
1	Bobcat E-2500	OMC 437	25 • 5000	Twin	15-1/2x40-3/4 Bogie	34-1/2x32 9/16x96	Manual	6.5	NA	\$695
FEATHERWEIGHT CORP., 9800 ST. LAWRENCE, MONTREAL, QUEBEC, CANADA										
--	Alouette M14	Sachs 227	14	Single	15x50 Bogie	42x31x98	Manual	5	310	\$750
1	Alouette M120	Sachs 293	20	Single	15x50 Bogie	42x31x98	Manual	5	320	\$895
1	Alouette M124	Kohler 338	24	Twin	15x50 Bogie	42x31x93	Manual	5	310	\$995
1	Alouette M128	Kohler 399	28	Twin	15x50 Bogie	42x31x93	Manual	5	330	\$1,095
2	Alouette M130W	Kohler 436	30	Twin	18x50 Bogie	42x34x93	Manual	5	365	\$1,195
1	Alouette 6723	Sachs 293	23	Single	15x50 Bogie	42x31x93	Manual	5	310	\$995
1	Alouette 6727	Sachs 336	27	Single	15x50 Bogie	42x31x93	Manual	5	322	\$1,095
1	Alouette 6736	Kohler 436	36	Twin	15x50 Bogie	42x31x93	Manual	5	335	\$1,250
2	Alouette 670-1	Hirth 634	40	Twin	18x15 Bogie	42x34x93	Manual	5	370	\$1,480
2	Alouette 670-2	Sachs 735	60	Twin	18x15 Bogie	42x34x93	Manual	5	395	\$1,585
FELDMAN ENGINEERING & MFG., INC., 633-639 MONROE ST., SHERBOYAN FALLS, WIS. 53085										
--	Snow Flake Mark II	Solo 180	11-1/2	Single	32 (length) Bogie	35x30x75	Recall	2	220	\$485
1	Supernark II	CGW 225	12-1/2	Single	32 (length) Bogie	35x30x75	Recall	2	227	\$595
1	Supernark II	CGW 312	20	Single	32 (length) Bogie	35x36x84	Recall	2	297	\$750
1	Supernark II	CGW 340	22-1/2	Twin	32 (length) Bogie	35x36x84	Recall	2	297	\$895
FOX CORPORATION, 1111 W. RACINE ST., JAMESVILLE, WIS. 53545										
--	For Trac Special	JTD 330	15.5	Single	15 (width) Bogie	34x34x102	Recall	5	360	NA
1	For Trac Future 340	JTD 340	24	Twin	15 (width) Bogie	34x34x102	Recall	5	380	NA
1	For Trac Future 399	JTD 399	28	Twin	15 (width) Bogie	34x34x102	Recall	5	370	NA
GILSON BROTHERS COMPANY, BOX 152, PLYMOUTH, WIS. 53073										
--	Gilson 430	Kohler 285	18	Single	15 (width) Bogie	39x32-1/2x100	Recall	4	400	NA
--	Gilson 422	Kohler 369	20	Single	15 (width) Bogie	39x32-1/2x100	Recall	4	400	NA
--	Gilson 431	Kohler 383	23	Single	22 (width) Bogie	39x39-1/2x100	Recall	4	500	NA
--	Gilson 432	Kohler 399	28	Twin	15 (width) Bogie	39x32-1/2x100	Recall	4	456	NA
--	Gilson 434	Kohler 440	30	Twin	18 (width) Bogie	39x35-1/2x100	Recall	4	460	NA
HELLSTAR CORPORATION, 1600 N. CHESTNUT, WAROO, NEB. 68066										
--	Jetstar 220	JTD 227	15.5	Single	15x32 Bogie	35x32x96	Manual	3.8	210	NA
1	Jetstar 327	JTD 327	20.5	Single	15x32 Bogie	35x32x96	Manual	3.8	225	NA
--	Jetstar 330	JTD 327	15.5	Single	15x32 Bogie	35x32x98	Manual	3.8	295	NA
1	Jetstar 440	JTD 432	20.5	Single	15x32 Bogie	35x32x98	Manual	3.8	310	NA
1	Jetstar 527	JTD 527	25	Single	15x32 Bogie	35x32x98	Manual	3.8	235	NA
1	Jetstar 550	JTD 550	25	Single	15x32 Bogie	35x32x98	Manual	3.8	320	NA
1	Jetstar 627T	JTD 627	24	Twin	15x32 Bogie	35x32x98	Manual	3.8	244	NA
1	Jetstar 660T	JTD 660	24	Twin	15x32 Bogie	35x32x98	Manual	3.8	326	NA
1	Jetstar 727T	JTD 727	28	Twin	15x32 Bogie	35x32x98	Manual	3.8	243	NA
1	Jetstar 770T	JTD 770	28	Twin	15x32 Bogie	35x32x98	Manual	3.8	334	NA
HERTZ, INC., WASECA, MINN. 56093										
--	Sitka	JTD 292	20.5	Single	18x44 Bogie	48x33x100	Recall	6	315	\$688
--	Yakutat	JTD 338	25	Twin	18x44 Bogie	48x33x100	Recall	6	330	\$729
--	Kodiak	Sachs 339	35	Twin	18x44 Bogie	48x33x100	Recall	6	360	\$799
2	Yukon	Kohler 339	24	Twin	18x44 Bogie	48x33x100	Recall	6	330	\$729
2	Barrow	Kohler 399	26	Twin	18x44 Bogie	48x33x100	Recall	6	360	\$759
1	Nitro G Short Track	Sachs 292	26	Single	15x36 Slide rail	NA	Recall	6	285	\$754
1	Nitro G Short Track	Sachs 336	27	Single	15x36 Slide rail	NA	Recall	6	285	\$824
1	Nitro G Short Track	Sachs 436	35	Twin	15x42 Bogie	48x33x100	Recall	6	325	\$739
1	Nitro GI	Sachs 292	26	Single	15x42 Bogie	48x33x100	Recall	6	340	\$769
1	Nitro GI	Sachs 336	27	Single	15x42 Bogie	48x33x100	Recall	6	340	\$769
--	Nitro GIII	Sachs 436	35	Twin	15x42 Bogie	48x33x100	Recall	6	365	\$809

Electric start available on all models.

CLASS*	MODEL	ENGINE MAKE & CC's	HORSE-POWER	NUMBER OF CYLINDERS	TRACK (INCHES ON GROUND) & SUSPENSION	OVERALL HEIGHT, WIDTH & LENGTH (INCHES)	STARTING SYSTEM	FUEL CAPACITY (GALLONS)	APPROX. WEIGHT (POUNDS)	MPG'S SUGGESTED RETAIL PRICE
INDUSTRIES BOUCHARD, LA FOCATIENE, QUEBEC, CANADA										
--	Moto-Ski Mini-Sno	JTD 223	NA	Single	15 (width) Bogie	35x31x60	Recall	4.7	205	\$595
1	Moto-Ski Capri	Hirt 292	NA	Single	15-5/8 (width) Bogie	41-1/2x32x101	Recall	6.25	325	\$745
1	Moto-Ski Capri	JTD 292	NA	Single	15-5/8 (width) Bogie	41-1/2x32x101	Recall	6.25	325	\$855
1	Moto-Ski Capri	Hirt 348	NA	Single	15-5/8 (width) Bogie	41-1/2x32x101	Recall	6.25	330	\$975
1	Moto-Ski Capri	JTD 399	NA	Single	15-5/8 (width) Bogie	41-1/2x32x101	Recall	6.25	335	\$975
--	Moto-Ski Zephyr	Hirt 348	NA	Single	15-5/8 (width) Bogie	41-1/2x32x101	Recall	6.25	365	\$925
--	Moto-Ski Zephyr	JTD 399	NA	Single	15-5/8 (width) Bogie	41-1/2x32x101	Recall	6.25	370	\$1,045
1	Moto-Ski Grand Prix	JTD 399	NA	Single	15-5/8 (width) Bogie	41-1/2x32x101	Recall	6.25	330	\$1,090
1	Moto-Ski Grand Prix	JTD 399	NA	Single	15-5/8 (width) Bogie	41-1/2x32x101	Recall	6.25	335	\$1,115
--	Moto-Ski Grand Prix	Hirt 348	NA	Single	15-5/8 (width) Bogie	41-1/2x32x101	Recall	6.25	370	\$1,295
2	Moto-Ski MS 18	JTD 399	NA	Single	15 (width) Bogie	41-1/2x32x109	Recall	6.25	380	\$1,175
2	Moto-Ski MS 18	Hirt 348	NA	Single	15 (width) Bogie	41-1/2x32x109	Recall	6.25	420	\$1,395
INGHAM INDUSTRIES LTD., INDUSTRIAL DRIVE, LANIGAN, SASK., CANADA										
--	Ski-Bee Scout 150	Sachs 297	15	NA	15x55 Bogie	NA31x97	Recall	4	305	NA
1	Ski-Bee Stinger 210	Sachs 297	21 & 21.5	NA	15x55 Bogie	NA31x97	Recall	4	310 & 265	NA
1	Ski-Bee Stinger 310	Sachs 336	23 & 24	NA	15x55 Bogie	NA31x97	Recall	4	310 & 265	NA
1	Ski-Bee Stinger 410	Sachs 368	25 & 26	NA	15x55 Bogie	NA31x97	Recall	4	315 & 275	NA
1	Ski-Bee Stinger 610	400-800P	30 & 60	NA	15x55 Bogie	NA31x97	Recall	4	340	NA
3	Ski-Bee Commander 510	Sachs 297	21	NA	20x64 Bogie	NA37x111	Recall	5	425	NA
INNOVAR INCORPORATED, BOX 874, DUNNELL, MINN. 56127										
4	Sno Coupe Sportster	JTD 436	30	NA	2/15-1/2 (w.) Coil Spring	48x47x114	Electric	NA	625	\$1,995
--	Sno Coupe Executive	JTD 436	30	NA	2/15-1/2 (w.) Coil Spring	53x47x114	Electric	NA	665	\$2,495
--	Sno Coupe Ranger	Polaris 488	39	NA	30 (width) Coil Spring	54x47x114	Electric	NA	700	\$2,595
ISOGAR CORPORATION, 120 WALL STREET, NEW YORK, N.Y. 10005										
--	Flying 180	180 760	40	Twin	Parallelgram Elastic	NA132x110	Electric	NA	370	NA
J. C. PENNEY COMPANY, INC., 1301 AVENUE OF THE AMERICAS, NEW YORK, N.Y. 10019										
1	Manhandler	Hirt 438	24	Twin	15x40 Bogie	41x32x102	Electric	5	380	\$1,180
JET DYNAMICS, INC., 1001 FIRST ST. SO., BOX 1131, ST. CLOUD, MINN. 56301										
--	Mini-Doo	Teumseh	12	Single	ATV	98 (length)	Electric	2	290	NA
--	Hornet	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	Stinger	JTD 434	27	Twin	15 (width)	104x32x33	Manual	4	315	NA
1	Stinger	JTD 399	24	Twin	15 (width)	104x32x33	Manual	4	300	NA
1	Stinger	JTD 340	24	Twin	15 (width)	104x32x33	Manual	4	290	NA
1	Stinger	Kohler 340	24	Twin	15 (width)	104x32x33	Manual	4	290	NA
1	Stinger Chassis	NA	NA	NA	15 (width)	104x32x33	NA	4	230	NA
JOHNSON MOTORS, DIV. OMC, WAUKEGAN, ILL. 60085										
3	Skee-Horse W. Trac 30E	OMC 437	30 @ 5800	Twin	20-1/2x41 Bogie	47x37x103	Recall	6	479	\$1,495
3	Skee-Horse W. Trac 30E	OMC 437	30 @ 5800	Twin	20-1/2x41 Bogie	47x37x103	Recall	6	432	\$1,395
3	Skee-Horse W. Trac 25E	OMC 437	25 @ 5300	Twin	20-1/2x41 Bogie	49x34x101	Recall	6.5	NA	\$1,255
3	Skee-Horse W. Trac 25	OMC 437	25 @ 5300	Twin	20-1/2x41 Bogie	49x34x101	Recall	6.5	NA	\$1,175
1	Skee-Horse Rampage	OMC 437	32 @ 6200	Twin	15-1/2x40-1/2 Bogie	37-1/2x32x98	Recall	6	336	\$1,095
1	Skee-Horse L. Trac 25	OMC 437	25 @ 5300	Twin	15-1/2x40-1/2 Bogie	42x32x96	Recall	6	336	\$995
1	Skee-Horse L. Trac 437	OMC 437	25 @ 5300	Twin	15-1/2x40-1/2 Bogie	42x32x96	Recall	6	336	\$895
KIRCHGAEPFER MERCURY, 1939 PIONEER ROAD, FOND DU LAC, WIS. 54935										
--	Merc 250ER	Mercury 439	25	Twin	17x49 Bogie	32-7/8x34-3/8x106	Electric	6	500	\$1,275
--	Merc 250E	Mercury 439	25	Twin	17x49 Bogie	32-7/8x34-3/8x106	Electric	6	490	\$1,195
--	Merc 250M	Mercury 439	25	Twin	17x49 Bogie	32-7/8x34-3/8x106	Electric	6	450	\$1,095
--	Lightning	COW 398	32	Twin	15-1/2x47 Bogie	29-5/8x33x98	Manual	5	370	\$1,075
--	Rocket	COW 339	25	Twin	15-1/2x47 Bogie	29-5/8x33x98	Manual	5	370	\$975
--	Merc 200	Hirt 292	20	Single	15-1/2x47 Bogie	31-1/2x31-1/2x101-5/8	Manual	5	355	\$795
LEISURE DESIGN CORP., BOX 706, EXCELSIOR, MINN. 55331										
1	LDA-9 400	COW 399	30	Twin	15x51 Bogie	31x32x96	Recall	5.5	300	\$1,295
1	LDA-9 340	COW 340	25	Twin	15x51 Bogie	31x32x96	Recall	5.5	300	\$1,195
LEISURE INDUSTRIES, 4600 WEST 77TH ST., EDINA, MINN. 55435										
1	Wildcat Super	Kohler 309	20	Single	15x127 Bogie	41x32x105	Manual	6.5	310	\$1,045
1	Wildcat Super-E	Kohler 309	20	Single	15x127 Bogie	41x32x105	Manual	6.5	340	\$1,140
1	Wildcat GT	Kohler 339	26	Twin	15x127 Bogie	41x32x105	Manual	6.5	345	\$1,195
1	Wildcat GT-E	Kohler 339	26	Twin	15x127 Bogie	41x32x105	Manual	6.5	375	\$1,290

Electric start available on Mini-Sno, Capri 336, Zephyr 336, Grand Prix 399 and MS 18 399. Speedometer standard on Zephyr, Grand Prix and MS 18 series; tachometer on Grand Prix and MS 18 series. Two year track warranty on machines under 336cc; 1 year on rest. All models come with tool box, Thermo cables, safety straps, emergency out-off switch, front and rear bumpers, side reflectors and non-slip footrests.

Kohler, Hirth and JTD options on Stinger 610. Twin headlights, chrome bumpers and fully enclosed engine standard. Wheel kit (front and rear) optional.

Options include a JTD 744cc engine on Sportster and Ranger and gold metal flake finish on all models.

Options include electric start on all models; tachometer, speedometer and Get-Kit on all but 200 model.

Mini-Doo has 4-cycle engine and 1319.50x8 wheels.

Electric start available on Wide-Trac 30E and 25E. Canvas cover, sprockets-chains and available on all models; tachometer and speedometer-odometer available on Wide-Trac 30E, Wide-Trac 30 and Rampage. Tow hitch available on two Light-Trac models.

Electric start optional on all manual starting models, except 200; Quicksilver Winter Formula 25 Snowmobile Oil, speedometer kit (Merc 250 & Merc 220), snowmobile cover, snow sled, snowmobile suits, single & dual trailers also available.

Electric start \$100 extra on both models.

CLASS*	MODEL	ENGINE MAKE & C.U.S.	HORSE-POWER	NUMBER OF CYLINDERS	TRACK (INCHES ON GROUND) & SUSPENSION	OVERALL HEIGHT, WIDTH & LENGTH (INCHES)	STARTING SYSTEM	FUEL CAPACITY (GALLONS)	APPROX. WEIGHT (POUNDS)	MFG.'S SUGGESTED RETAIL PRICE	
LEISURE-MOR, INC., 512 W. 9TH ST., P.O. BOX 2212, GREEN BAY, WIS. 54306											
--	Scat-20	Kohler 295	20	Single	18 (width) Bogie	44x31x98	Recall	5	304	\$895	Electric starter, console, powered steering, easy-glide suspension, metal-flake colors, speedometer and tachometer available on all Pacer models.
2	Pacer-25	Kohler 399	26	Twin	18 (width) Bogie	44x31x98	Recall	5	344	\$995	
2	Pacer-28	Kohler 399	28	Twin	18 (width) Easy glide	41x31x96	Recall	5	270	\$1,095	
2	Pacer-32	Kohler 399	32	Twin	18 (width) Easy glide	41x31x96	Recall	5	280	\$1,135	
2	Pacer-35	Kohler 618	35	Twin	18 (width) Easy glide	41x31x96	Recall	5	300	\$1,295	
2	Pacer-38	Hirth 634	38	Twin	18 (width) Easy glide	41x31x96	Recall	5	315	\$1,335	
2	Pacer-38	Hirth 634	38	Twin	18 (width) Easy glide	41x31x96	Recall	5	320	\$1,435	
LIONEL ENTERPRISES INC., 1440 ST. CATHERINE ST., WEST, MONTREAL, QUEBEC, CANADA											
--	Sno-Prince XL-300-S	Sachs 277	15	Single	15-3/4 (width) Bogie	35x31x98	Manual	4.8	320	NA	Speedometer standard on all GT models; optional on others. Tachometer standard on GT-640; optional on rest. Engine covers and deluxe aluminum cast handlebar standard on GT series. All models come with under-seat storage compartment. Electric start optional on all models but XL-300-S and XL-300-J.
1	Sno-Prince XL-300-J	JLO 295	15	Single	15-3/4 (width) Bogie	35x31x98	Manual	4.8	320	NA	
1	Sno-Prince XL-340	Hirth 338	18	Single	15-3/4 (width) Bogie	35x31x98	Manual	4.8	330	NA	
1	Sno-Prince XL-340/2	JLO 399	22	Twin	15-3/4 (width) Bogie	35x31x98	Manual	5.05	345	NA	
1	Sno-Prince XL-400	JLO 399	24	Twin	15-3/4 (width) Bogie	35x31x98	Manual	5.05	345	NA	
--	Sno-Prince GTS-340	Hirth 372	24	Single	35x33-1/2x298	35x33-1/2x298	Manual	5.05	355	NA	
2	Sno-Prince GT-400	JLO 399	24	Twin	35x33-1/2x298	35x33-1/2x298	Manual	4.8	360	NA	
2	Sno-Prince GT-800	Hirth 493	28	Twin	35x33-1/2x298	35x33-1/2x298	Manual	4.8	370	NA	
2	Sno-Prince GT-640	Hirth 634	35	Twin	35x33-1/2x298	35x33-1/2x298	Manual	4.8	380	NA	
MASSEY-FERGUSON INC., 1901 BELL AVE., DES MOINES, IOWA 50315											
1	SKI-WHLZ 300S	JLO 292	18.5	Single	15-1/2x28 Bogie	41x32x99-1/2	Recall	3.5	325	NA	Options include electric start, tachometer, snowmobile covers, shock absorbers, snow flaps, tote bags, gas gauge caps, sprockets, mirrors, cigar lighter.
1	SKI-WHLZ 300SS	JLO 336	22	Single	15-1/2x28 Bogie	41x32x99-1/2	Recall	3.5	335	NA	
--	SKI-WHLZ 400SST	JLO 340	24	Twin	15-1/2x44-1/2 Bogie	42x32x106	Recall	5.5	380	NA	
--	SKI-WHLZ 500SST	JLO 399	28.3	Twin	15-1/2x44-1/2 Bogie	42x32x106	Recall	5.5	395	NA	
MTD PRODUCTS, INC., 5389 W. 130TH, CLEVELAND, OHIO 44130											
--	Trackmaster-350-910	Sachs 277	16	Single	15-1/2x19 Bogie	NA	Manual	3	350	\$799	Options include racing gear ratios, 5 dash instruments, tinted windshield, extra rear storage.
--	Trackmaster-350-930 (35)	Sachs 290	19-1/2	Single	15-1/2x19 Bogie	NA	Manual/Elc.	4	380	\$859	
--	Trackmaster-350-950 (55)	Sachs 293	25	Single	15-1/2x19 Bogie	NA	Manual/Elc.	4	400	\$999	
--	Trackmaster-350-960 (65)	Kohler 340	24	Twin	15-1/2x19 Bogie	NA	Manual/Elc.	5	420	\$1,019	
--	Trackmaster-350-970 (75)	Kohler 399	28	Twin	15-1/2x19 Bogie	NA	Manual/Elc.	5.2	420	\$1,109	
MONTGOMERY WARD & CO., 619 W. CHICAGO AVE., CHICAGO, ILL. 60607											
1	Wards 300	Kohler 295	20	Single	15 (width) Bogie	39x32-1/2x100	Recall	4	350	\$899	Electric start, speedometer and cover optional on both models.
2	Wards 450	Kohler 440	30	Twin	18 (width) Bogie	39x35-1/2x100	Recall	4	390	\$1,199	
MOTO-KOMETIK, INC., ST-JEAN PORT-JOLI, QUEBEC, CANADA											
--	M.K. II	GM 225	12.5	Single	12 (width)	42x31x81	Manual	3.9	260	\$695	Options include electric start (except M.K. II and III), tachometer, speedometer, reverse, towbar, snow flap.
--	M.K. III	GM 225	12.5	Single	15 (width)	42x32x101	Manual	5.4	310	\$695	
1	M.K. III	GM 312	19.5	Single	15 (width)	42x32x101	Manual	NA	320	\$825	
1	M.K. III	GM 340	25	Twin	15 (width)	42x32x101	Manual	NA	340	\$950	
1	M.K. III	GM 400	30	Twin	15 (width)	42x32x101	Manual	NA	340	\$995	
NEW FRONTIER CORPORATION, 4030 SOUTH DIVISION AVENUE, GRAND RAPIDS, MICH. 49508											
--	Scatmobile Green VI	Kohler 295	20	Single	14-1/2x24 Tires	47x40x100	Electric	3	390	\$1,350	Wheels, cover, cleats optional.
NORTESPORT INDUSTRIES, INC., SAULT STE. MARIE, MICH. 49783											
--	Timberwolf 395	JLO 395	26	Single	Two 15x40 Bogie	48x46x112	Recall	6.5	525	\$1,645	Options: reversing trans. except model 800; electric start, tach., speedometer, heater, temp. gauge, hitch.
4	Timberwolf 400	JLO 399	28	Twin	Two 15x40 Bogie	48x46x112	Recall	6.5	535	\$1,695	
4	Timberwolf 800	JLO 744	45	Twin	Two 15x40 Bogie	48x46x112	Recall	6.5	595	\$1,995	
NORTHWAY SNOWMOBILES LTD., 2066 CHARTIER STREET, DORVAL, QUEBEC, CANADA											
1	N-640	Hirth 640	36	Twin	15x40 Bogie	39x32x87	Recall	6.2	280	\$1,175	Options include electric start, tachometer, speedometer, snowmobile covers, shock absorbers, snow flaps, tote bags, gas gauge caps, soundproof padding and silo suspension.
2	NH-640	Hirth 640	36	Twin	15x40 Bogie	39x32x87	Recall	6.2	295	\$1,225	
1	N-400	GM 400	30	Twin	15x40 Bogie	39x32x87	Recall	6.2	295	\$1,080	
1	NH-400	GM 400	30	Twin	15x40 Bogie	39x32x87	Recall	6.2	280	\$1,100	
2	N-340	GM 340	25	Twin	15x40 Bogie	39x32x87	Recall	6.2	275	\$1,080	
2	NH-340	GM 340	25	Twin	15x40 Bogie	39x32x87	Recall	6.2	280	\$850	
1	N-300	Sachs 293	20	Single	15x40 Bogie	39x32x87	Recall	6.2	270	\$800	
--	NH-300	Sachs 293	20	Single	15x40 Bogie	39x32x87	Recall	6.2	270	\$775	
2	N-250	GM 250	19	Single	15x40 Bogie	39x32x87	Recall	6.2	250	\$775	
2	NH-250	Sachs 440	35	Twin	15x40 Bogie	39x32x87	Recall	6.2	270	\$1,180	
2	NH-250	Sachs 440	35	Twin	15x40 Bogie	39x32x87	Recall	6.2	290	\$1,345	
ORIGINAL EQUIPMENT MANUFACTURING LTD., 564 OLIVION AVE., SUDBURY, ONTARIO, CANADA											
--	Snowbug	Sachs 277	18	Single	26x40	43 (height)	Manual	2	300	NA	
--	Superbug	Sachs 297	22	Single	26x40	43 (height)	Manual	2	325	NA	
--	Levbug	Sachs 340 SS	27	Single	31.5x40	50 (height)	Manual	2	435	NA	
OFFSHORE MARINE CORP. OF CANADA, PETERBOROUGH, ONTARIO, CANADA											
--	Snow Cruiser 201	Kohler 295	20	Single	Cleated	43x33x98	Manual	5	NA	\$925	Tachometer and speedometer optional on all models.
--	Snow Cruiser 201E	Kohler 295	20	Single	Cleated	43x33x98	Electric	5	NA	\$1,045	
--	Snow Cruiser 281	Kohler 399	28	Twin	Molded	43x33x98	Manual	5	NA	\$1,150	Canadian machines by Outboard Marine Corp. of Canada are the same as Johnson and Evinrude.
--	Snow Cruiser 2011	OMC 437	25	Twin	Cleated	49-1/2x34-1/2x101	Manual	5	NA	\$1,225	
--	Snow Cruiser 2016	OMC 437	30	Twin	Cleated	47-1/2x37x103	Electric	5	NA	\$1,495	
--	Snow Cruiser RK321	Kohler 399	32	Twin	Molded	38-1/2x33x101	Manual	5	NA	\$1,250	
--	Snow Cruiser RK361	Kohler 437	36	Twin	Molded	38-1/2x33x101	Manual	5	NA	\$1,295	

CLASS*	MODEL	CC'S	POWER	CYLINDERS	SUSPENSION	LENGTH (INCHES)	SYSTEM	(GALLONS)	(POUNDS)	RETAIL PRICE	
POLARIS INDUSTRIES, ROSELAND, MINN. 56751											
--	Playmate	Star 175	12	Single	12x32 Bogie	41x31-1/2x292	Recoil	3.5	290	\$995	Tachometer, speedometer, kick stand, cigar lighter and shock dampened skis optional on all Chargers. Electric start available on all Chargers 398 through 488.
--	Charger	Star 234	20	Twin	15-1/2x45 Drift Skipper	41x31-1/2x2107	Recoil	5.9	420	\$995	
--	Charger	Star 335	23	Twin	15-1/2x45 Drift Skipper	41x31-1/2x2107	Recoil	5.9	420	\$995	
--	Charger	Star 398	27	Twin	15-1/2x45 Drift Skipper	41x31-1/2x2107	Electric/Recoil	5.9	420	\$1,095	
--	Charger	Star 432	30	Twin	15-1/2x45 Drift Skipper	41x31-1/2x2107	Electric/Recoil	5.9	420	\$1,145	
--	Charger	Star 488	32	Twin	15-1/2x45 Drift Skipper	41x31-1/2x2107	Electric/Recoil	5.9	420	\$1,245	
3	Mustang	Star 398	27	Twin	20x45 Drift Skipper	45x33x110	Electric/Recoil	5.9	475	\$1,245	Tachometer, kick stand, cigar lighter, shock dampened skis and electric start optional.
3	Mustang	Star 488	32	Twin	20x45 Drift Skipper	45x33x110	Electric/Recoil	5.9	475	\$1,345	
4	Voyager	Star 488	32	Twin	30x45 Bogie	49x39-1/2x108	Electric	5.9	590	\$1,995	Tach., lighter and shock skis optional.
--	TX Charger	Star 294	20	Twin	15-1/2x45 Power Slide	40x31-1/2x2107	Recoil	5.9	390	\$1,095	Kick stand and shock dampened skis optional on all TX Charger models.
--	TX Charger	Star 335	23	Twin	15-1/2x45 Power Slide	40x31-1/2x2107	Recoil	5.9	390	\$1,195	
--	TX Charger	Star 398	27	Twin	15-1/2x45 Power Slide	40x31-1/2x2107	Recoil	5.9	390	\$1,295	
--	TX Charger	Star 432	32	Twin	15-1/2x45 Power Slide	40x31-1/2x2107	Recoil	5.9	390	\$1,395	
--	TX Charger	Star 613	70	Three	15-1/2x45 Power Slide	40x31-1/2x2107	Recoil	5.9	420	NA	
--	TX Charger	Star 795	80	Three	15-1/2x45 Power Slide	40x31-1/2x2107	Recoil	5.9	420	NA	
POLARON PRODUCTS, INC., 165 HUGENOT ST., NEW ROCHELLE, N.Y. 10801											
1	Cyclone 704J	JLD 295	18	Single	15-1/2x50 Bogie	40x34-1/2x101	Recoil	4-1/8	300	\$395	Electric starter kit available for Cyclone 704J and Tornado B04K. Chromplated kick stand and protective covers of low temperature nylon available for all models.
1	Cyclone II 705K	Kohler 295	18	Single	15-1/2x50 Bogie	40x34-1/2x101	Electric	4-1/8	330	\$1,145	
1	Tornado B04K	Kohler 399	26	Twin	15-1/2x50 Bogie	40x34-1/2x101	Recoil	4-1/8	320	\$1,195	
1	Tornado II 805K	Kohler 399	26	Twin	15-1/2x50 Bogie	40x34-1/2x101	Electric	4-1/8	350	\$1,345	
RIDGE RUNNER, INC., 1625 WASHINGTON ST., MINNEAPOLIS, MINN. 55413											
--	Ridge Runner	Kohler 618	33	Twin	2/15x64 Bogie	57x45x112	Electric	12	800	\$1,995	Options: Top, bucket seats, radio, plow.
ROLL-O-FLEX, LTD., 8TH AVENUE & TORONTO ST., REGINA, SASK., CANADA											
1	Apache	CGW 292	20	Single	15x114 Bogie	34x32x103	Recoil	3.5 Imp.	313	NA	Electric start optional on all models; speedometer and tachometer standard on Comanche SS series, optional on all other models.
1	Apache	CGW 340	25	Twin	15x114 Bogie	34x32x103	Recoil	3.5 Imp.	313	NA	
1	Apache	CGW 400	31	Twin	15x114 Bogie	34x32x103	Recoil	3.5 Imp.	313	NA	
1	Apache	CGW 440	36	Twin	15x114 Bogie	34x32x103	Recoil	3.5 Imp.	285	NA	
1	Comanche SS	CGW 295	22	Twin	15x96 Bogie	34x32x94	Recoil	3.5 Imp.	285	NA	
1	Comanche SS	CGW 340	25	Twin	15x96 Bogie	34x32x94	Recoil	3.5 Imp.	285	NA	
1	Comanche SS	CGW 400	31	Twin	15x96 Bogie	34x32x94	Recoil	3.5 Imp.	285	NA	
1	Comanche SS	CGW 440	36	Twin	15x96 Bogie	34x32x94	Recoil	3.5 Imp.	285	NA	
1	Cherokee	CGW 340	25	Twin	18x114 Circus Bogie	34x32x103	Recoil	3.5 Imp.	324	NA	
1	Cherokee	CGW 400	31	Twin	18x114 Circus Bogie	34x32x103	Recoil	3.5 Imp.	324	NA	
1	Cherokee	CGW 440	36	Twin	18x114 Circus Bogie	34x32x103	Recoil	3.5 Imp.	324	NA	
RUPP INDUSTRIES, INC., 1776 AIRPORT RD., MANSFIELD, OHIO 44903											
--	S-23	JLD 293	14	Single	15-1/2 (width)	36x31x96-1/2	Manual	5	294	\$295	Electric start available on all models except S-23; other options: racing seat, racing windshield, speedometer, tachometer, kick stand, snow flaps, plus cigarette lighter on WT-440.
1	S-29	Sachs 295	18	Single	15-1/2 (width)	36x31x96-1/2	Manual	5	304	\$355	
1	S-34	CGW 340	NA	Twin	15-1/2 (width)	36x31x96-1/2	Manual	5	315	\$1,025	
1	S-44	Bupp 440	34	● 6500	15-1/2 (width)	36x31x96-1/2	Manual	5	323	\$1,155	
2	WT-440	Bupp 440	34	● 6500	15-1/2 (width)	36x31x96-1/2	Manual	5	349	\$1,255	
2	WT-534	Hirth 534	NA	Twin	15 (width)	36x31x96-1/2	Manual	5	358	\$1,355	
SCORPION, INC., CROSBY, MINNESOTA 56441											
--	Mark I	Sachs 275	16	Single	15x106 Bogie	43x30-1/2x296	Manual	5	265	\$295	Electric start optional on Mark II, Stinger II, Stinger III. Expansion chambers and racing kits available for some models.
1	Mark II	Sachs 293	19	Single	15x115 Bogie	43x30-1/2x299	Manual	6	285	\$395	
1	Mark II	CGW 400	30	Twin	15x115 Bogie	43x30-1/2x299	Manual	6	285	\$395	
1	Stinger II	Sachs 293	19	Single	15x119 Bogie	43x30-1/2x299	Manual	6	285	\$395	
1	Stinger II	CGW 293	22	Twin	15x119 Bogie	43x30-1/2x299	Manual	6	285	\$395	
1	Stinger II	CGW 400	30	Twin	15x119 Bogie	43x30-1/2x299	Manual	6	285	\$395	
1	Stinger II	Sachs 440	35	Twin	15x119 Bogie	43x30-1/2x299	Manual	6	285	\$395	
--	Stinger III	CGW 293	22	Twin	18x119 Bogie	43x30-1/2x104	Manual	6	335	\$395	
2	Stinger III	CGW 400	30	Twin	18x119 Bogie	43x30-1/2x104	Manual	6	335	\$395	
2	Stinger III	Sachs 440	35	Twin	18x119 Bogie	43x30-1/2x104	Manual	6	335	\$395	
--	Super Stinger Series:	Available to qualified racers--contact local Scorpion dealers for model and engine options.									
SKIRoule LTD., WICKHAM, QUEBEC, CANADA											
--	S-250	Sachs 277	16	Single	15-1/4x53 Bogie	32-3/4x33-1/4x102	Recoil	4.5 Imp.	290	\$725	Standard on both 15-1/4 and 19-inch track machines are polycarbonate safety windshields, tilting nylon bowls, seamless nylon fuel tanks, aluminum steering arms and tool kits.
1	S-300	Sachs 293	20	Single	15-1/4x53 Bogie	32-3/4x33-1/4x102	Recoil	4.5 Imp.	300	\$825	
1	S-300	Sachs 293	20	Single	15-1/4x53 Bogie	32-3/4x33-1/4x102	Recoil	4.5 Imp.	300	\$825	
1	S-340	CGW 339	24	Twin	15-1/4x53 Bogie	32-3/4x33-1/4x102	Recoil	4.5 Imp.	294	\$925	
1	S-400	CGW 398	28	Twin	15-1/4x53 Bogie	32-3/4x33-1/4x102	Recoil	4.5 Imp.	294	\$995	
1	SE-400	CGW 398	28	Twin	15-1/4x53 Bogie	32-3/4x33-1/4x102	Recoil	4.5 Imp.	320	\$1,095	
1	SE-440	Sachs 436	35	Twin	15-1/4x53 Bogie	32-3/4x33-1/4x102	Recoil	4.5 Imp.	365	\$1,245	
2	R-400	CGW 398	28	Twin	19x53 Bogie	33-1/4x37x102	Recoil	4.5 Imp.	340	\$1,045	
2	RE-400	CGW 398	28	Twin	19x53 Bogie	33-1/4x37x102	Recoil	4.5 Imp.	365	\$1,145	
2	RT-500	Sachs 436	35	Twin	19x53 Bogie	33-1/4x37x102	Recoil	4.5 Imp.	350	\$1,245	
SKI STAR, 600 W. 10TH AVE., MONMOUTH, ILL. 61462											
--	Ski Star 295	Kohler 295	20	Single	1B (width) Bogie	33-1/2x36x98	Electric	5	380	\$1,018	
2	Ski Star 440	Kohler 440	30	Twin	1B (width) Bogie	33-1/2x36x98	Electric	5	430	\$1,152	

CLASS*	MODEL	ENGINE MAKE & CC'S	HORSE-POWER	NUMBER OF CYLINDERS	TRACK (INCHES ON GROUND) & SUSPENSION	OVERALL HEIGHT, WIDTH & LENGTH (INCHES)	STARTING SYSTEM	FUEL CAPACITY (GALLONS)	APPROX. WEIGHT (POUNDS)	MFG.'S SUGGESTED RETAIL PRICE
SMT MANUFACTURERS LTD., CTE. CHATEAUGUAY, QUEBEC, CANADA										
1	Deluxe	Guidetti 338	25 • 6000	Single	15 (width)	42x34x106	Manual	3	330	\$1,045
1	Super Sport	Guidetti 338	30 • 6000	Single	15 (width)	42x34x106	Manual	3	330	\$1,095
---	Deluxe G4 44	Guidetti 438	30 • 7000	Twin	15 (width)	42x34x106	Manual	4	363	\$1,245
---	Super Sport G4 44	Guidetti 438	30 • 7000	Twin	15 (width)	42x34x106	Manual	4	363	\$1,345
SNO-JET, INC., P.O. BOX 9968, AUSTIN, TEXAS 78757										
1	Star Jet	Yamaha 292	19	Single	15-1/2x32 Bogie	30-3/4x31-1/2x96	Recall	4	280	\$799-\$839
1	Star Jet	Hirth 292	18-19	Single	15-1/2x32 Bogie	30-3/4x31-1/2x96	Recall	4	292	\$799-\$839
1	Star Jet	Hirth 338	19	Single	15-1/2x32 Bogie	30-3/4x31-1/2x96	Recall	4	303	\$799-\$839
1	Star Jet D-13	Yamaha 338	24	Twin	15-1/2x32 Bogie	30-3/4x31-1/2x96	Recall	4	290	\$843-\$1,069
1	SS Jet	Yamaha 396	27	Twin	15-1/2x32 Bogie	30-3/4x31-1/2x96	Recall	4	310	\$943-\$1,159
1	SS Jet	Yamaha 396	27	Twin	15-1/2x32 Bogie	30-3/4x31-1/2x96	Recall	4	310	\$943-\$1,159
1	SS Jet	Yamaha 396	27	Twin	15-1/2x32 Bogie	30-3/4x31-1/2x96	Recall	4	310	\$943-\$1,159
1	SS Jet	Yamaha 396	27	Twin	15-1/2x32 Bogie	30-3/4x31-1/2x96	Recall	4	310	\$943-\$1,159
1	SS Jet	Yamaha 396	27	Twin	15-1/2x32 Bogie	30-3/4x31-1/2x96	Recall	4	310	\$943-\$1,159
1	SS Jet	Yamaha 396	27	Twin	15-1/2x32 Bogie	30-3/4x31-1/2x96	Recall	4	310	\$943-\$1,159
2	Super Jet	Yamaha 396	27	Twin	18-1/2x32 Bogie	32x36x100-1/2	Recall	5	348	\$1,043-\$1,299
2	Super Jet	Hirth 634	35	Twin	18-1/2x32 Bogie	32x36x100-1/2	Recall	5	348	\$1,043-\$1,299
SOMVEX, INC., P.O. BOX 190, L'ISLET, QUEBEC, CANADA										
---	Ohlmo	Husavarna 150cc	10	Single	12x32 Bogie	30x28x72	Recall	2.9 Imp.	134	\$349
SPORTSCRAFT INDUSTRIES, A COMPTON COMPANY, 2256 TERMINAL RD., ST. PAUL, MINN. 55113										
---	Swinger	Chrysler 134	10	Single	12x34 Ridge-Glide	36x28x72	Recall	3.6	175	\$499
SPORTS POWER INC., 1460 STUBLEY MEMORIAL HWY., ST. PAUL, MINN. 55118										
---	Sno-Pony 180	Solo 180	15.5 • 6500	Single	15 (width) Bogie	32x30x81	Recall	2.25	220	NA
---	Sno-Pony 220	Solo 220	16.6 • 6600	Single	15 (width) Bogie	32x30x81	Recall	2.75	220	NA
---	Sno-Pony Wasp 220C	Solo 220	16.6 • 6600	Single	15 (width) Bogie	32x30x81	Recall	1.5	250	NA
---	Sno-Pony 295R	JLO 295	19.5 • 5500	Single	15x30 Bogie	32x30x86	Recall	2.75	250	NA
1	Sno-Pony 340 Twin	CGW 340	21 • 4500	Twin	15x30 Bogie	32x30x86	Recall	2.75	250	NA
STARCRAFT CO., COLLIER AVE., GOSHEN, IND. 46526										
---	Escort 280	Sachs 277	15	Single	15x30 Bogie	43x34x98	Recall	5	310	\$760
1	Escort 290	Sachs 293	21	Single	15x30 Bogie	43x34x98	Recall	5	320	\$910
1	Escort 340	Kohler 339	24	Twin	15x30 Bogie	43x34x98	Recall	5	310	\$1,025
1	Escort 400	Kohler 399	28	Twin	15x30 Bogie	43x34x98	Recall	5	330	\$1,125
2	Escort 440	Kohler 436	30	Twin	18x50 Bogie	43x34x98	Recall	5	365	\$1,225
1	Eliminator 290	Sachs 293	23	Single	15x30 Bogie	43x34x98	Recall	5	310	\$955
1	Eliminator 340	Sachs 336	29	Single	15x30 Bogie	43x34x98	Recall	5	322	\$1,095
1	Eliminator 440	Kohler 436	36	Twin	15x30 Bogie	43x34x98	Recall	5	335	\$1,260
2	Eliminator 640	Hirth 634	40	Twin	18x50	43x34x98	Recall	5	370	\$1,450
2	Eliminator 740	Sachs 736	60	Twin	18x50	43x34x98	Recall	5	395	\$1,595
TRANS-SKI, C.P. 24, COMPTON, QUEBEC, CANADA										
---	Standard 10	CGW 225	12.5	Single	795 sq. in.	33x30-1/2x39-1/2	Recall	5	310	\$695
---	Standard 10SS	CGW 225	12.5	Single	795 sq. in.	33x30-1/2x39-1/2	Recall	5	310	\$750
---	Standard 12	Sachs 277	14	Single	795 sq. in.	33x30-1/2x39-1/2	Recall	5	315	\$750
1	Standard 16SS	Benelli 346	18	Single	795 sq. in.	33x30-1/2x39-1/2	Recall	5	315	\$845
1	Deluxe 20	Guidetti 338	22	Single	795 sq. in.	33x30-1/2x39-1/2	Recall	5	340	\$895
1	Deluxe 20SS	Sachs 336	27	Single	795 sq. in.	33x30-1/2x39-1/2	Recall	5	335	\$1,075
1	Deluxe 20S	CGW 339	25	Twin	795 sq. in.	33x30-1/2x39-1/2	Recall	5	355	\$1,095
---	Deluxe 25	Sachs 436	27	Twin	795 sq. in.	33x30-1/2x39-1/2	Recall	5	360	\$1,195
---	Deluxe 30	Sachs 436	35	Twin	795 sq. in.	33x30-1/2x39-1/2	Recall	5	365	\$1,360
---	Deluxe 60	Sachs 735	65	Triple	795 sq. in.	33x30-1/2x39-1/2	Recall	5	395	\$1,695
TT INDUSTRIES, BOX NO. 51, EUGENETON, MINN. 56128										
1	Sno-Shoo 201-15	JLO 292	20	Single	15x44 Bogie	46x32x100	Recall	6	305	NA
1	Sno-Shoo 207-18	JLO 292	20	Single	15x44 Bogie	46x32x100	Recall	6	315	NA
1	Sno-Shoo 247-15	JLO 338	24	Twin	15x44 Bogie	46x32x100	Recall	6	320	NA
1	Sno-Shoo 247-18	JLO 338	24	Twin	15x44 Bogie	46x32x100	Recall	6	330	NA
1	Sno-Shoo 248-15	Kohler 339	24	Twin	15x44 Bogie	46x32x100	Recall	6	320	NA
1	Sno-Shoo 248-18	Kohler 339	24	Twin	15x44 Bogie	46x32x100	Recall	6	330	NA
2	Sno-Shoo 248-18	Kohler 339	24	Twin	15x44 Bogie	46x32x100	Recall	6	330	NA
2	Sno-Shoo 385-18	Sachs 436	35	Twin	15x44 Bogie	46x32x100	Recall	6	350	NA
1	H-P 248-15	Sachs 336	24	Single	15x33 Slide rail	41x32x89	Recall	6	280	NA
1	H-P 248-15	Sachs 336	24	Single	15x33 Slide rail	41x32x89	Recall	6	280	NA
1	H-P 338-15	Sachs 436	35	Twin	15x44 Bogie	41x32x100	Recall	6	310	NA
1	H-P 1-248-15	Sachs 292	25	Single	15x44 Bogie	41x32x100	Recall	6	315	NA
1	H-P 2-278-15	Sachs 340	27	Single	15x44 Bogie	41x32x100	Recall	6	340	NA
1	H-P 3-355-15	Sachs 436	35	Twin	15x44 Bogie	41x32x100	Recall	6	340	NA
VALCANTIER INDUSTRIES, INC., COURCELLETTE, QUEBEC, CANADA										
---	Passerpartout 171	Sachs	22.5	Single	1488 sq. in.	50x47-3/4x96	Manual	5	750	\$695

Options include electric start, speedometer, tachometer, plus slide rail and seat riser on 15" track machines.

Options include electric start, speedometer, tachometer, plus slide rail and seat riser on 15" track machines.

Electric start, two speeds, tool kit optional. *See additions on page A-9.

CLASS*	MODEL	ENGINE MAKE & CC'S	HORSE- POWER	NUMBER OF CYLINDERS	TRACK (INCHES ON GROUND) & SUSPENSION	OVERALL HEIGHT, WIDTH & LENGTH (INCHES)	STARTING SYSTEM	FUEL CAPACITY (GALLONS)	APPROX. WEIGHT (POUNDS)	MFG.'S SUGGESTED RETAIL PRICE
VIKING SNOWMOBILES, INC., P.O. BOX 37, TWIN VALLEY, MDN. 56584										
1	Vigilante 1272000	Kohler 295	20	Single	15x44 Bogie	30x32x105	Recoil	6.5	310	\$799
1	Vagabond 1272500	Kohler 340	25	Twin	28x32x107	28x32x107	Recoil	6.5	345	NA
1	Vagabond 1272800	Kohler 399	28	Twin	15x44 Bogie	28x32x107	Recoil	6.5	350	NA
1	Vagabond 1273000	Kohler 440	30	Twin	15x44 Bogie	28x32x107	Recoil	6.5	350	NA
2	Voyageur 114300	Kohler 440	30	Twin	18x40 Bogie	28x32x105	Recoil	6.5	365	NA
2	Vanquisher 1145000	Kohler 440	50	Twin	18x40 Bogie	28x32x105	Recoil	6.5	365	NA
WILLIAMSBURG BRONZE CORP., KINWOOD, W. VA. 26137										
1	Phantom	JLO 292	19.5	Single	15-1/2x49 (length) Bogie	34x35x99	Recoil	5	300	\$995
1	Phantom	JLO 338	25	Single	15-1/2x49 (length) Bogie	34x35x99	Recoil	5	305	\$1,138
1	Phantom	JLO 395	27	Single	15-1/2x49 (length) Bogie	34x35x99	Recoil	5	320	\$1,227
1	Phantom	JLO 433	27	Twin	15-1/2x49 (length) Bogie	34x35x99	Recoil	5	330	\$1,320
1	Phantom	NA	NA	NA	15-1/2x49 (length) Bogie	30x35x99	Recoil	5	NA	NA
1	Phantom Ghost	Will be made in four models: specs not yet available.								
YAMAHA INTERNATIONAL CORP., BOX 54540, LOS ANGELES, CALIF. 90054										
1	SL292	Yamaha 292	20	Single	15x42 Bogie	38x32-1/4x99-1/2	Recoil	4	310	\$799
1	SL338	Yamaha 338	24	Twin	15x42 Bogie	38x32-1/4x99-1/2	Recoil	4	348	\$899
2	SW396	Yamaha 396	27	Twin	18x42 Bogie	40-3/4x36-1/4x99-1/2	Recoil	5	379	\$1,045
--	GP396	Yamaha 396	28	Twin	15x42 Bogie	38x32-1/4x99	Recoil	4	353	\$995
--	SS433	Yamaha 433	40 @ 6500	Twin	15x42 Bogie	38x32-1/4x99	Recoil	4	353	\$1,150
YARDMAN, INC., 410 W. GANSON ST., JACKSON, MICH. 49202										
--	Sno Cub	JLO 99	4.2	Single	10-1/2x22 Bogie	28-1/2x30-3/4x62-1/2	Recoil	1.1	125	\$399
Standard equipment includes snow flap and stop light on SL292, SL338 and SW396 models (electric start optional); speedometer, tachometer, and snow flap on GP396 and SS433 models.										
Standard: Primary drive, variable speed pulleys. Transmission, forward & reverse. Optional: Electric start. 2-speed forward and reverse.										
Standard on all models: Tool kit, fuel filter, power-tuned muffler, tinted windshield, back rest, storage compartment, fuel pump, carburetor, front bumper, rear bumper, rear hand rail.										
*CHAPARRAL INDUSTRIES INC., 5995 N. WASHINGTON ST., DENVER, COLO. 80216										
3	Executive	Kohler 399	26	Twin	20.5 (width) Bogie	33x37x100	Manual	5.7	350	
3	Executive	Hirth 399	22	Twin	20.5 (width) Bogie	33x37x100	Manual	5.7	322	
3	Executive	Hirth 493	27	Twin	20.5 (width) Bogie	33x37x100	Manual	5.7	350	
3	Executive	Hirth 634	36	Twin	20.5 (width) Bogie	33x37x100	Manual	5.7	360	
*VALCARTIER INDUSTRIES, INC., COURCELETTE, QUEBEC, CANADA										
--	Passaparout	Sachs 336	22.5	Single	2-12x60	50x47-3/4-36	Manual	5	750	
*SHARK MANUFACTURING, INC., 15952 EAST 17TH AVE., AURORA, COLORADO 80010										
--	Shark 1230	Hirth 230	15.5	Single	18 (width) Bogie	34x x93	Recoil	3.5	200	
--	Shark 292	Hirth 292	20	Single	18 (width) Bogie	34x x93	Recoil	3.5	210	
2	Shark 399	Hirth 399	23.5	Single	18 (width) Bogie	34x x93	Recoil	3.5	220	
2	Shark 338	Hirth 338	28	Single	18 (width) Bogie	34x x93	Recoil	3.5	220	
2	Shark 399	Hirth 399	30	Twin	18 (width) Bogie	34x x93	Recoil	3.5	230	
2	Shark 634	Hirth 634	36	Twin	18 (width) Bogie	34x x93	Recoil	3.5	240	

Not all manufacturers list track-inches-on-the-ground in the same way. Length of the continuous track and not the true length of track on the ground has been given by some. Other manufacturers have not listed any "inches on the ground" figure. Local dealers for the snowmobiles can furnish this information.

The following additional information was furnished to the Miscoula Equipment Development Center by the manufacturer:

APPENDIX B

**PURCHASING
GUIDELINES**

PURCHASING GUIDELINES

These are general guidelines for purchasing snowmobiles and should be modified to meet local conditions and use. For example, the prospective purchaser is advised to specify a brake control that shall be frostproof, corrosion resistant and trouble-free. The purchaser should specify a drum-type or disc-type brake.

Equipment managers, experienced in purchasing snowmobiles, indicated that snowmobiles should be traded in every two years because maintenance and repair costs increase rapidly the third year. Since this evaluation did not include reliability tests, the 2-year trade-in figure could not be verified.

Before a machine is purchased, the local dealer or distributor should be thoroughly checked for availability of good service and replacement parts.

DESCRIPTION OF SERVICE CONDITIONS

These vehicles are to be used to transport Forest Service personnel doing surveying, timber cruising, watershed studies, recreation area planning and other similar winter work. The vehicles will be operated over varying terrain — from flat, open ground to cross-country travel in rough, timbered terrain. Usually, travel will be on snow cover except in early and late winter operations when these vehicles will be operated on short patches of muddy or rocky ground. Snow travel will be on packed snow, firm snow, soft snow, and powder snow. The vehicles will be used in severe weather, including rain, snow, sleet, wind, and temperatures ranging from +60° F to as low as -50° F.

DESIGN REQUIREMENTS

The vehicle shall consist of a chassis, engine, cowling, and be propelled by an endless track or tracks. The vehicle shall be steered by one or two skis.

The chassis shall be constructed of high-quality steel or aluminum. The cowling shall be constructed of a lightweight, durable material such as Fiberglas or aluminum, adequately reinforced and braced. The cowling shall cover the engine and drive train, and it shall be hinged or removable to permit easy access to the engine, transmission, and other components within the cowling.

The seat shall be large enough to accommodate two people and shall have a backrest. The cushions and backrest shall be covered with a durable upholstery, have adequate padding to absorb severe shock, and provide a comfortable ride.

To simplify selection, oversnow vehicles were classified into four categories according to specifications of table 1-B.

DETAILED REQUIREMENTS

1. Engine. The engine must be 2-cycle, air-cooled, and shall have a compression ratio suitable for high performance and operation with regular gasoline.

Fuel type. The engine shall be designed to burn regular gasoline mixed with oil to provide both maximum power and proper engine lubrication.

Ignition. The manufacturer shall furnish his standard ignition system for the type of engine used in the snowmobile. All electrical wiring shall be properly routed and securely anchored.

Starting. Vehicles may be equipped with either an electrical starting system or a manual, recoil-type starter. All vehicles equipped with an electric starter shall also have a backup starting system, either a manual recoil starter or manual cable pull starter that is easily accessible.

Performance. The engine shall be designed for snowmobile operation and shall perform efficiently at maximum and minimum speeds without vibration and overheating, and it shall be easy to start during cold weather.

Table 1-B. —*Snowmobile class dimensions*

Snowmobile class	Track width	Minimum engine		Maximum machine weight ¹
		Cubic centimeters	Horsepower	
1	Single track less than 16 inches wide	292	20	380
2	Single track 16-19 inches wide	395	24	430
3	Single track 20-23 inches wide	395	27	510
4	Single or double track 24 inches and wider	395	27	630

¹ Dry weight including electric starter (30 pounds).

Size. Reference table 1-B for category limits.

Engine accessories. The engine shall be furnished complete with all accessories and attachments normally furnished to commercial purchasers as standard equipment. All engine components requiring periodic servicing and maintenance shall be made readily accessible through suitable parts and covers. A reliable meter for recording hours of engine operation shall be provided.

2. Drive train, track and suspension

Drive train. The drive train shall consist of a variable ratio, speed-sensitive torque converter and heavy-service-grade roller drive chain. The clutch shall be centrifugally operated. The drive train shall be shielded from personnel by cowlings and protective covers.

Track. The track shall consist of an endless belt of rubber or polyurethane reinforced with at least three plies of nylon, rayon, or polyester. Steel may be used to reinforce grousers, providing it is molded into the track or otherwise permanently fastened to the track. The track shall be interchangeable and replaceable. A track tension adjustment shall be provided.

Suspension system. The suspension shall be the manufacturer's standard system for this type of vehicle. Manufacturers offering both slide rail suspension or the bogie suspension system shall be notified by the purchaser which type is desired. Slide rail systems shall be interchangeable or replaceable. Bogie wheel bearings shall be either lifetime lubricated or shall be designed for periodic lubrication with low-temperature grease. Vehicles with bogie suspensions must also be provided with retainers on bogie wheel brackets to prevent bogie wheels from flipping over.

3. Steering. Steering shall be accomplished by one or two spring-mounted ski(s) assemblies connected to a steering wheel or handlebar. Each assembly shall come equipped with a replaceable ski. There shall be a stop on each ski to limit its angle when the aft end of the ski breaks through the snow or when the vehicle is operated in reverse.

4. Exhaust system. The exhaust system shall be designed to muffle engine noise and protect the occupants from exhaust fumes and all hot metal surfaces.

5. Controls

Brakes. A drum-type or a disc-type brake shall be provided, designed to insure stopping and holding a vehicle under normal operating conditions. The brake control shall be frostproof, corrosion-resistant and trouble-free.

Throttle control. The throttle shall be hand-operated, on the handlebars. Control cables shall work freely and shall be frostfree and corrosion-resistant.

Ignition and starter control. The starter and ignition shall be operated by a key. Two keys shall be provided.

6. Dimensions and weight. Refer to table 1-B for the specified class.

7. Miscellaneous

Windshield. Vehicle shall be equipped with a Plexiglas or safety-type windshield.

Lighting system. All vehicles shall be equipped with adequate headlamp(s) and taillamp(s) for night operation.

Tow bar. The rear of the snowmobile shall have a tow bar or hitch point suitable for towing additional equipment.

Storage compartment. A closed compartment shall be provided to carry personal items and handtools.

Tools and spare parts. The manufacturer shall furnish an initial supply of spare parts and handtools that are ordinarily furnished. In addition, one each of the following shall be furnished: (1) drive belt, (2) sparkplug, (3) starter cable or rope, (4) headlight and taillight bulbs.

Fuel tank and capacity. A rust-proof gas tank with a minimum capacity of _____ U.S. gallons and a fuel filter in the fuel line shall be provided.

Painting. All surfaces customarily painted, except corrosion-resistant polished surfaces or trim, shall be painted the manufacturer's standard colors.

Covering. The vehicle shall be equipped with a heavy-duty, waterproof canvas or vinyl covering with sufficient tie-downs to furnish weather protection during transportation and storage.

9. Manufacturer's identification. Each vehicle shall bear the manufacturer's name, trademark, model number and serial number, either cast integral with, stamped, or otherwise marked on the vehicle in a conspicuous place. The information may be presented on a corrosion-resistant metal plate securely affixed to the vehicle.

GENERAL CONDITIONS

1. Inspection and Tests

Equipment furnished in response to a bid invitation will be subject to inspection and tests determined by the contracting officer to be necessary to ascertain conformance with a specification. Acceptance of equipment or the waiving of the inspections and tests thereof, shall in no way relieve the contractor of the responsibility for furnishing equipment meeting the requirements of a specification.

2. Service

Upon being advised of receipt of the equipment at a destination, the contractor shall furnish the Forest Service at no extra cost the services of a fully qualified, trained mechanic or serviceman to supervise the proper assembly and operation of the equipment. It is required that under his supervision and responsibility the vehicle be completely adjusted, all equipment installed, completely lubricated with manufacturer's recommended lubricants, and made ready for continuous operation. In addition, the Forest Service operator(s) shall be instructed in the proper operation and maintenance of the vehicle. All of the materials for the foregoing operations shall be furnished by the contractor.

The contractor shall furnish a minimum of one free "follow-up" service call to be made by a fully qualified, trained mechanic or serviceman. This service call shall be made within 45 days after acceptance of vehicle.

3. Data to be furnished by contractor

Two copies of a parts catalog for the engine, drive train, steering mechanism, and other components of the drive assembly, and two copies of the complete instructions for operation, maintenance and servicing of each vehicle shall be furnished with the machine. In addition to the above, one copy of all written material shall be supplied to the Regional Fleet Equipment Office.

The manufacturer of a vehicle must have a dealership within a 50-mile radius of the delivery point of this equipment, where parts and service shall be readily available. The successful bidder or contractor shall furnish to the purchaser the names and addresses of dealers in that area.

4. Warranty

Submission of a bid in response to an invitation shall constitute a bidder's warranty against defects in workmanship and materials for a period of 90 days from the date of acceptance. On notice by the Forest Service, the contractor shall at his own expense and with his own or his local dealer's personnel, promptly replace, repair, and install (including shipping and labor costs) such equipment, parts, or materials found to be defective during the warranty period.

The submission of a bid shall also, in the absence of specific qualifications by the bidder, constitute his certification that the vehicle(s) with accessory equipment, component units, and parts will be suitable for the work to be performed and will be constructed to definite standard dimensions, with proper clearances and fits. If the unit offered does not fully comply with specifications, the bidder shall state definitely, referring to the proper paragraph of specification, wherein the equipment he proposes to furnish does not comply.

APPENDIX C

**MAINTENANCE
GUIDELINES**

MAINTENANCE GUIDELINES

For successful snowmobile operation, maintenance is essential. Snowmobiles are usually operated off-the-road, far from any qualified mechanic or service center. A few minutes spent each day on maintenance could prevent a long, cold walk.

Controls should be checked daily and lubricated weekly. Check the anchored ends of control cables for broken cable strands. It is much easier to repair problems like this in the shop than in the field. Check for full travel of the throttle cable. Use light machine oil on the lever linkage points and slug pins. To prevent freeze-ups, squirt antifreeze down the tubes through which the control cables run.

The brake control should be adjusted so full pressure is applied while there is still at least 1/2-inch of space between the lever and the handlebar. Only in an emergency should a broken throttle cable be replaced with brake cable, and, if this is done, the trip should be completed with due respect for the fact that the brake is inoperative.

Check daily the tightness of the bolts that fasten the skis to the turning spindles. Check the steering linkage and handlebar mounts for loose connections. Check the alignment of the skis.

With the engine cover off, check daily the condition of the drive belt. If the belt is cracked or frayed, replace it. If the belt is slightly worn, reverse it. Uneven or abnormal wear may mean the drive pulleys are out of line. This should be checked by a qualified mechanic or dealer. If you have never replaced a drive belt, practice this procedure before starting on a trip, following the owner's manual. Be sure to carry a spare belt at all times. Following the manufacturer's recommendations and procedures, lubricate the pulley shaft with a light coating of low-temperature grease. Excess grease can get on the pulleys and cause belt slippage and deterioration.

Bogie wheels, the rear axle, and fittings should be lubricated weekly with a low-temperature grease in a low-pressure grease gun. Ski legs or spindles should also be greased. Steering tie rod ends and bushings should be oiled.

Track alignment should be checked daily, and the track tension checked weekly. Too tight a track will reduce performance. Free-play between track and bogie wheels, or slider suspension on some new models, will be specified in the owner's manuals and must be set for an equal amount on each side.

The track should be checked daily for inserts and cleats that may be missing and need replacing. Also, check the track for cuts, abrasions, and other signs that may indicate that the track is deteriorating and needs replacing. Inspection can be accomplished by tipping the machine up on its side and rotating the track by hand.

Improper fuel mixtures are the major cause of engine damage. Regular lead or low-lead (not premium or marine) automotive gasoline of at least 75 octane should be mixed with snowmobile oil (not outboard, straight mineral, or multi-viscosity oil) as specified by the manufacturer. Never fill the fuel tank with gasoline and then add oil, trusting they will mix in the tank. Cleanliness and proper mixture are important. Most makes of snowmobiles use a 20-to-1 gas-oil ratio; however, check the owner's manual to be sure. Too much oil in the fuel mix will cause sparkplug fouling, pre-ignition, and loss of power. Too little oil can cause overheating, burned sparkplugs, and even piston seizure and a broken connecting rod or crankshaft. Follow the manufacturer's recommendations for engine break-in and fuel mixtures.

Check sparkplug gap and appearance once a week. Black, sooty plugs mean too rich a fuel mixture or too much idling. A bleached, brown-ashy look around the points may indicate a burned plug that is getting a lean mixture or possibly a plug of improper temperature range. Failure to start often results from one of the sparkplug conditions described.

Unless the machine has been in constant operation or seems to be losing power, carburetor adjustment once a month is probably sufficient. Too often, people are not familiar enough with carburetor adjustments, and tinkering can be harmful. Carburetor models differ; check your owner's manual or let a qualified serviceman adjust the carburetor.

Monthly checks should include the carburetor mounting flange nuts, exhaust pipe flanges and supports, all engine mount bolts, and a general inspection of the machine for loose or worn parts.

At the end of the winter season, all lube points should be oiled or greased as recommended by the manufacturer. The manufacturer's instructions should be followed for summerizing the engine, fuel tank, and lines. The machine should be stored under shelter off the ground. The area should be free of rodents which may build nests in the machine and eat the belts and cushions.

A maintenance check list by day, week, and month is furnished below. If a routine of maintenance is followed, it will lead to smoother snowmobile operations.

MAINTENANCE CHECK LIST

	Daily	Weekly	Monthly
Throttle ease and travel	X		
Throttle cable anchors		X	
Hand brake travel	X		
Hand brake adjustments		X	
Ski mounting bolts	X		
Steering linkages and handlebar mounts		X	
Ski alignment		X	
Drive belt	X		
Bogie wheels: bearings		X	
mounts		X	
springs		X	
Track: alignment	X		
tension		X	
inserts	X		
cleats	X		
condition	X		
Sparkplug(s): condition		X	
gap		X	
Carburetor: mounting flange nuts			X
adjustments			X

		Daily	Weekly	Monthly
Exhaust system:	pipe flanges		X	
	supports		X	
Engine:	mounting bolts			X
	general inspection for loose components			X
Fuel tank:	supply	X		
	fuel line and connections		X	
	fuel filter		X	
Electrical:	wiring connections and proper anchors		X	
	ignition switch	X		
Main frame and tunnel:	fractures		X	
	loose bolts		X	
Drive chain case:	mounting			X
	chain adjustment			X
Cowling for fractures:	anchors		X	
	light mountings		X	
Extra belt, sparkplug(s), tools and needed items		X		



